COMMONWEALTH of VIRGINIA

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COMMISSIONER

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July 1, 2024

To: The Honorable Louise L. Lucas, Chair, Senate Finance & Appropriations Committee
The Honorable Luke E. Torian, Chair, House Appropriations Committee

From: Nelson Smith, Commissioner, Department of Behavioral Health and Developmental Services

Re: Item 311.MM., 2023 Appropriations Act

Item 311.MM of the 2023 Appropriations Act directs the Department of Behavioral Health and Developmental Services (DBHDS) to evaluate potential public-private partnership arrangements for the Catawba Hospital Transformation Plan. The language reads:

> *MM. Out of this appropriation, $500,000 the second year from the general fund shall be provided for the Department of Behavioral Health and Developmental Services to evaluate public-private partnership arrangements for the Catawba Hospital Transformation Plan or other potential alternatives for the provision of behavioral health or substance use disorder services, including private sector options. This shall include, but not limited to, potential public-private partnerships to manage and operate a substance use disorder facility and to manage a new residential treatment program and outpatient facility. The Department shall assess how the surrounding localities and their local law enforcement agencies may work together to share efforts in transporting and taking custody of individuals under an emergency custody order or temporary detention order who would otherwise be transported to Catawba. Additionally, the Department shall consult with the Opioid Abatement Authority to assess if and how the surrounding localities may pool their opioid settlement funds to aid in the Catawba Hospital Transformation Plan. The Department shall report their preliminary findings to the Chairs of the House Appropriations and Senate Finance and Appropriations Committees by December 1, 2023, and submit a final report by July 1, 2024.*

Please find enclosed the report in accordance with Item 311. MM. DBHDS staff are available should you wish to discuss this request.

cc: Secretary John Littel

Prepared for:
Secretary of Health and Human Resources in cooperation with the Department of Behavioral Health and Developmental Services

Feasibility Analysis for a Substance Use Disorder Treatment Facility on the Catawba Campus

Roanoke, Virginia

June 20, 2024

DBHDS
Virginia Department of Behavioral Health and Developmental Services

Acknowledgement

The management, programming, and planning team of HDR Architecture is grateful for the participation, inspiration, confidence, and enduring resolution of all that were key to this study, without whose participation this effort could not have occurred. We thank all those that have provided their valuable input.

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Executive Summary Overview

Virginia has fewer beds dedicated to substance use disorder than 45 of the 50 states. Nationally, only 9% of the people needing substance use disorder (SUD) treatment are receiving it. Since dedicated SUD beds are not available, patients are partially treated in the expensive behavioral health spaces of the Commonwealth's hospital system. This feasibility study addresses the need for SUD treatment beds, the costs to provide them, and the potential savings to the Commonwealth if the appropriate treatment and services are provided by adding a dedicated substance use disorder treatment facility on the Catawba Hospital campus.

According to the National Institutes of Health, every dollar spent on increasing access to care for substance use disorders results in a savings of $11 ($4 in health care costs and $7 in criminal justice costs)

Potential Benefits:

- Quicker treatment of SUD patients with access to the full continuum of care
- Reduction of readmissions
- Increasing revenue of state mental health facilities by freeing up beds – allowing partially reimbursed beds occupied by SUD patients to become fully reimbursable.
- Lowering patient census from 98% to 85% thereby providing a safer environment for staff and patients.
- Behavioral beds released; treatment can be provided to those only suffering from mental health issues.
- Decreasing cost to treat SUD patients by approximately 40% versus treatment at a behavioral health facility.
- Decreased pressure on Law Enforcement. A new SUD facility on the Catawba Hospital Campus in conjunction with the new crisis centers will decrease law enforcement time with patients in crisis destined to state mental health facilities.
- Provide treatment to SUD patients with complex mental health; this group of patients are typically not receiving the full continuum of care.
- New SUD units are designed with flexibility to address the fluctuations that occur in the needs of the regional population of 2.5 million so that bed utilization is maximized in an efficient and safe manner.

Substance Use Disorder Treatment Facility Summary

Continuum of Care Model	SUD Inpatient Beds	SUD Detox Beds	SUD Residential Treatment Beds	SUD Outpatient Research Building (SF)	Project Cost** (Millions)	Project Duration (Months)
Mini	64	16	96	52,000	$161	56
Base	104	32	128	52,000	$240	58
Enhanced	128	32	160	70,000*	$274	60

* Approximately 17,000 SF of shell space is included for future expansion

** Includes 25% Soft cost, 15% Design Contingency and Approximately 14.5% Escalation to Midpoint of Construction

Executive Summary

More than 100,000 people in the United States died from drug overdoses in 2021; 2,656 of those were Virginians. Roanoke Valley is one of the hardest hit regions of Virginia that is suffering from substance use disorder (SUD) and the Commonwealth of Virginia is determined to fight this epidemic. Virginia has fewer beds dedicated to substance use disorder than 45 of the 50 states. Since dedicated beds are not available, patients are treated in expensive psychiatric spaces of the Commonwealth's hospital system. This feasibility study addresses the needed beds, the cost to provide them, and the potential savings to the Commonwealth if the appropriate treatment beds and services are available by providing a new SUD treatment facility on the Catawba Facility campus.

The estimated cost to provide a new substance use disorder facility on the Catawba campus ranges from $161 million for the bare minimum to $274 million for the full need as determined by the data analyzed in the Data Analysis and Bed Needs section. This investment in the treatment and care of Virginia residents is clearly needed. The new SUD facility will have in its reach 2.5 million people covering 17 cities, including the City of Roanoke, Staunton, Harrisonburg, Charlottesville; and 51 counties spanning from Warren County in the north to Lee County in the Southwestern part of the state.

The $274 million investment, assuming the enhanced option is exercised, can potentially come from Opioid Settlement Funds. The Commonwealth is scheduled to receive $1.1 billion over the next 15 years, roughly $73 million per year. According to the Concept Schedule section, it will take five years for the SUD facilities to become fully operational. During this period approximately $365 million will flow to Virginia, more than enough to fund the development of the SUD facility. However, the money is allocated and parceled out to state agencies, cities, counties, and Opioid Abatement Authority as explained in the Potential Funding Source -- Opioid Settlement Fund section.

Th

SUD Outpatient Building, SUD Inpatient, SUD Residential Housing surrounding Catawba Hospital looking Northwest - Option C

No one entity receives more than $14 million a year in unrestricted funds. As a result, the new SUD facilities cannot be easily fully funded using the Opioid Settlement Funds. Various soft costs like initial design, final design, furniture, inspections, or similar services could potentially access some of the funds. But to use only Opioid Settlement Funds for the entire project costs would require:

1. the collaboration of many agencies, cities, counties and the Opioid Authority Agency to dedicate their portion of the Opioid Settlement Funds to the project,
2. issuance of bonds paid back by the Opioid Settlement Funds, the structure of which would likely require legislation, or
3. legislation requiring reallocation of the Opioid Settlement Funds off the top and keeping the percent of funds disbursed as is current; that is reducing the disbursement and allocation of funds from $1.1 billion to $939-$826 million and the remaining $274-$161 million for the development of the new SUD facility.

SUD Treatment

Currently, people in need of SUD treatment have few options to receive the full continuum of care necessary for lasting recovery. The American Society for Addiction Medicine (ASAM) levels fully described in the section entitled “The ASAM Continuum of Care for Adult Addiction” provides an understanding of what is necessary to provide comprehensive treatment to person with SUD. Unfortunately, currently no one facility or location provides all the levels of care. Consequently, people receive partial care in various locations by various providers. The current setup results in individuals switching location and providers in order to access a new level of SUD care; or often results in the individuals choosing to stop treatment. Those who stop treatment, whether inpatient or outpatient, often return to the environment which led them to using the substances for which they were being treated.

By providing all levels of care in one location, patients will be less likely to walk away and not get the level of care they need, and therefore they are less likely to need readmission later.

Behavioral Healthcare System Impact

The current healthcare system is not efficient in treating SUD patients, particularly those with a dual diagnosis of SUD and mental health diagnoses. 35% to 65% of SUD patients in the Virginia behavioral health system have a co-occurring mental health condition. These patients often receive great care for their mental health issues and stabilization for their SUD; unfortunately, they do not receive the full continuum of care necessary for their SUD. Medicare, Medicaid, and private insurers set limits on what may be reimbursed. For example, treatment for the mental health condition and stabilization may be fully reimbursable, but if the patient needs further SUD treatment and is on a waitlist for a suitable treatment facility, the hospital, at best, is reimbursed for custodial care, or not reimbursed at all. The effect of this is two-fold; the hospital has a behavioral bed offline until the patient is transferred, and the hospital is incurring costs which will not be reimbursed.

By providing the new SUD facility, the amount of time a patient is in the behavioral healthcare system is decreased and a behavioral health bed is more quickly available to treat mental health patients (and get reimbursed), and the patient is receiving SUD treatment (and the SUD provider is getting reimbursed).

This report's section titled, "A Personal Journey to Care section" tells the story of Mathew, a person with addiction who entered the healthcare system. Matthew was transferred to the new SUD treatment facility after about 24 hours, where he was able to access the full continuum of SUD treatment. Today, without the SUD facility, Matthew would likely be a patient in the behavioral healthcare system for at least 16 days, and if his mental health issues are resolved and if SUD stabilization occurs after 6 days, then 10 days would not be reimbursed, costing the Commonwealth between $9,000 and $11,000, depending on which hospital the patient was sent.

SUD Inpatient and adjacent Catawba Hospital looking Northwest - Option C

SUD Provider Operator

The key to the success of the new SUD facility is having the right operator. In the sections, "Substance Use Disorder and Behavioral Health & Public-Private Care Models", and "Potential Public-Private Care Partners (Operators and Providers)", the benefits of having a private sector partner is explored and examples of successful partnerships are provided. This serves as a unique situation for the Commonwealth. For this project, the desire is to have an operator

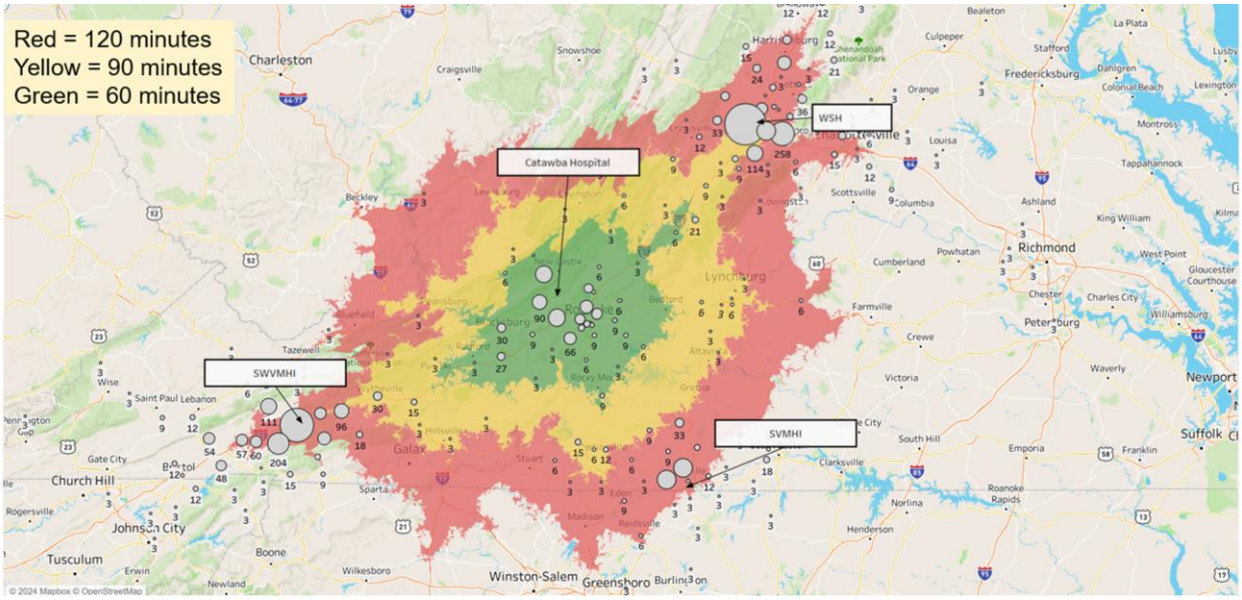
partner. The nature of the partnership beyond that will need to be defined. The initial definition must be made by the Commonwealth in a Request for Qualifications with the final definition resulting from the negotiations with interested partners. It is important that the operator partner be involved during the design as they will have insights into how they would operate the facility.

Workforce and Staffing

An initial concern was if the operator partner would be able to find staff without raiding the staff of the four state behavioral health hospitals in the region. In the Workforce Development section of the report, it is noted that over 30,000 people in the Valley support healthcare or are healthcare professionals.

One element that is analyzed in the "Workforce Development" section shows the distribution of the staff for each state hospital relative to their "home" hospital and the Catawba campus. It was noticed that most staff live within about a 30-minute drivetime to their home hospital.

Workforce Location and Drivetime Relationship from Catawba Hospital



Source: HDR Advisory Services, workforce counts updated May 2024

The migration of unskilled or semi-skilled workers is likely to depend largely on the pay between the new SUD facility and the surrounding healthcare systems. It is unlikely that finding this level of workers will be a problem. The real concern is whether the pool of skilled workers and professionals at the hospital would leave to join the SUD facility staff. There is a different skillset that SUD professionals have from those of behavioral health professionals and therefore, unlikely that the SUD facility will raid the behavioral health system. That leaves the skilled workers, nurses, clinicians, etc. at risk; fortunately, the risk of departure is small as well. In addition to the 30,000 plus healthcare workers in the Valley, there are various nearby educational institutions generating a constant stream of new, talented, skilled workers and professionals.

To recruit staff for the new SUD facility, the Commonwealth and the operator provider should consider expanding, where possible, partnerships with education institutions that provide training and research opportunities for both the current and future staff. To ensure that Catawba Hospital remains an attractive place to work, priority should be given to enhancing employee satisfaction and cultivating a positive workplace culture. This can be achieved through thoughtful design and planning, such as creating welcoming and functional workspaces, offering flexible work arrangements, and providing amenities that promote well-being and work-life balance. These elements can help foster a supportive and collaborative environment that appeals to both current and prospective staff.

SUD Outpatient Building and Existing Catawba Hospital Looking Northeast – Option C

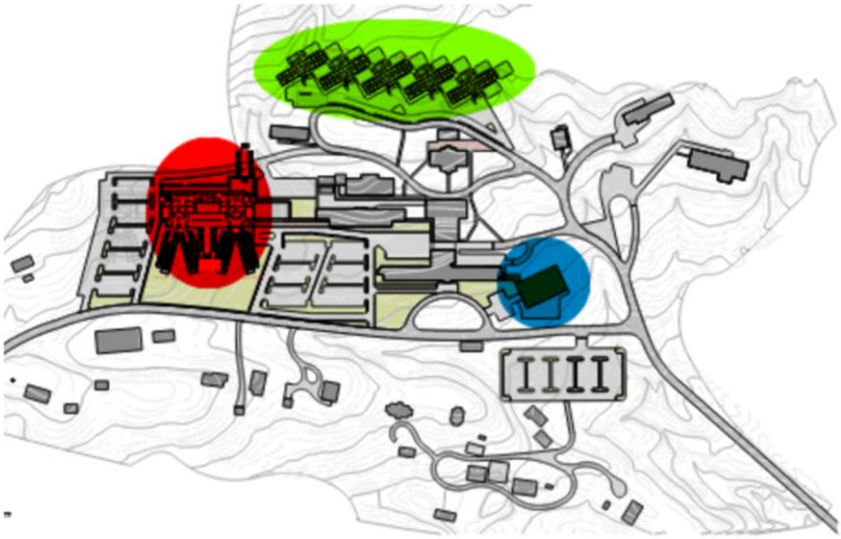
Designed for Treatment -- Facility Flexibility

Patients struggling with substance use disorders have complex needs, and most have various co-occurring issues that need to be served in the level of care that is most appropriate for their presenting symptomology. The right treatment (level of care) at the right dose (length of time and number of services) is the optimal goal. Having a full, flexible continuum allows the patient to be placed where they need to be clinically, not where there happens to be an open bed or space for them. From there, the patient moves to the next, less intensive level of care that provides the right “dose” of care for their needs. Patients move both “up” and “down” in levels of care, as needed. Most patients will “step down” from more intensive to less intensive services over time. However, there are occasions where patients need to “step up” to restabilize before moving back “down” in levels of care.

The new units for the SUD facility on the Catawba Hospital campus are designed so that there is great flexibility to address the fluctuations that occur in this population's needs. For example,

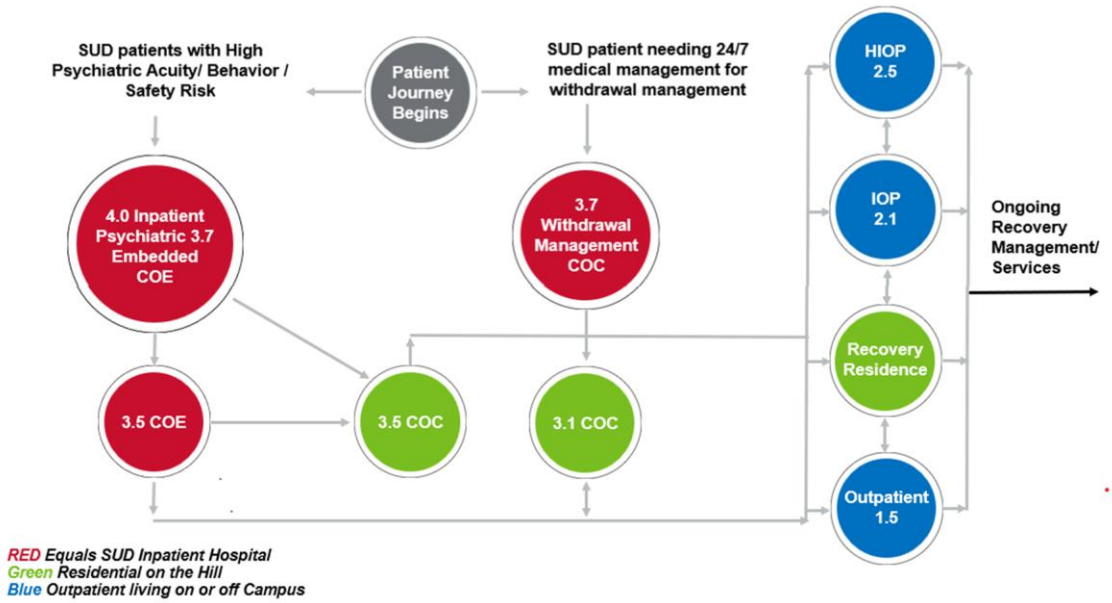
withdrawal management beds can also be used as observation beds; other beds in this area can be used for co-occurring enhanced services for those needing wrap-around “on-unit” services. The residential “Hillside” buildings can be used for either long-term or short-term residential OR as a non-licensed recovery residence that allows patients to continue in a supportive setting. In this way, bed utilization is maximized efficiently and safely.

Bed Type Location



RED Equals SUD Inpatient Hospital
Green Residential on the Hill
Blue Outpatient living on or Off Campus

Flow Chart for Bed Type by ASAM Level of Care



RED Equals SUD Inpatient Hospital
Green Residential on the Hill
Blue Outpatient living on or off Campus

The functional and space programs were developed along three models – a mini-continuum of care (Option A), a base continuum of care (Option B), and an enhanced continuum of care (Option C). In all three models, the full range of services planned with each model providing for a different number of patients to be treated effectively through the full continuum of care. More details on each model are provided below:

Option A – Mini-Continuum of Care Model

This model is considered the minimum effort necessary to effectively deal with the increasing SUD cases in the area. To accomplish this, 64 SUD Inpatient beds would be provided in a new building that will meet best practices and conform it into a state-of-the-art building that is desired by the Commonwealth. Behind the existing Building 15 on the hill three new residential buildings would be built to provide SUD long term, short term, and recovery residential units, which total 96 beds.

A new 52,000 square foot three-story SUD outpatient facility would be built adjacent to Building 15 to provide outpatient services, administrative, clinical, educational and research space unique to SUD treatment.

Option B – Base Continuum of Care Model

To accomplish this Option, 104 SUD Inpatient beds would be provided in a new building that will meet best practices and conform it into a state-of-the-art building that is desired by the Commonwealth. Behind the existing Building 15 on the hill 4 new residential buildings would be built to provide SUD long term, short term, and recovery residential units, which total 128 beds. A new 52,000 square foot, three-story SUD outpatient facility would be built adjacent to Building 15 to provide outpatient services, administrative, clinical, educational and research space unique to SUD treatment.

Option C – Enhanced Continuum of Care Model

For this Option, 128 SUD Inpatient beds would be provided in a new building that would meet best practices and conform it into a state-of-the-art building that is desired by the Commonwealth. Behind the existing Building 15 on the hill 5 new residential buildings would be built to provide SUD long term, short term, and recovery residential units, which total 160 beds. A new 70,000 square foot four-story SUD outpatient facility would be built adjacent to Building 15 to provide outpatient services, administrative, clinical, educational and research space unique to SUD treatment. One story would be shell space for future growth.

To assess the existing facility's capability to support much needed SUD services, a multi-disciplinary group of architects and engineers assessed the condition of each building on the Catawba Hospital campus to ascertain the condition and suitability for reuse and repurposing to support this program. Concurrently with the building assessments, the architects identified the types and sizes of spaces necessary to provide the continuum of care services per best practices. Ultimately it was determined that repurposing existing buildings was not feasible.

Introduction

In 1908, the Commonwealth of Virginia purchased the property that is the location of Catawba Hospital and appropriated $40,000 to establish the first tuberculosis sanatorium which was operated until the late 1960s, at which time it began its transformation into a behavioral health facility. The last tuberculosis patient was admitted in 1972.

The Department of Behavioral Health and Developmental Services (DBHDS) operates nine mental health facilities in the Commonwealth, four of which are major mental health hospitals and serve the Appalachian area of Virginia: Catawba Hospital, Southern Virginia Mental Health Institute, Western State Hospital, and Southwestern Virginia Mental Health Institute. Western State Hospital, the newest of the four, was completed in 2013.

The rise in substance use disorder nationally and particularly in the Appalachian area of Virginia over the last 20 years has resulted in an increased need to treat individuals for substance use disorder and the mental health issues that often accompany the disease. Located at the epicenter of this growing crisis in the Commonwealth, a new SUD facility on the Catawba Hospital campus could become a state-of-the-art facility for substance use disorder treatment and recovery of individuals with this disease.

Item 283 of the 2022 Appropriations Act directed the Secretary of Health and Human Resources to "contract for a feasibility analysis to transform the Catawba Hospital Campus into a state-of-the-art campus at which a continuum of substance abuse treatment and recovery services, including long-term, short-term, acute and outpatient services, is provided in addition to the array of behavioral health services currently provided to the individuals in need of behavioral health care services."

The Department of Behavioral Health and Developmental Services (DBHDS) contracted with HDR Inc. to update the prior feasibility analysis. This comprehensive study explores the potential for establishing a new SUD facility at the Catawba Hospital campus. The facility would offer a full spectrum of substance use disorder treatment and recovery services, catering to the needs of adult and geriatric individuals.

The creation of a substance use disorder treatment campus at Catawba has an underlying goal of reducing the Commonwealth's psychiatric hospital bed census at the four hospitals by diverting or stepping down clients whose needs are better served by substance use disorder treatment.

In this study the "continuum of care" model, would be provided to substance use disorder patients. A continuum of care is a system that provides a comprehensive range of health services, so that care can evolve with the patient's recovery over time. With the understanding that a patient's health may be most vulnerable during gaps in care, the continuum of care exists to ensure those gaps are filled.

The concept of continuum of care is not a universal feature of all health systems. Nationally, very few health systems provide the full continuum of care. A new SUD facility that provides all levels of care will be unique and elevate the Commonwealth's healthcare system to elite status.

Four critical things are being created for bridging the gaps.

- On site SUD research and educational partners,
- New SUD Inpatient Hospital
- New SUD residential treatment transitional housing beds that do not exist in the state system today, and
- SUD Outpatient services to be provided on the same campus where patients receive care.

One of the gaps that will be filled is SUD outpatient care. Some of the services that will be provided in the new outpatient building are one-on-one counselling, group counseling, outpatient pharmacy, and other clinical care. Access for patients to medical assisted withdrawal and long-term counseling access is critical to the long-term success of the continuum of care.

Medications can help people quit opioids, but fewer than 10% of patients who could benefit from those medications actually receive them. Researchers based at Rhode Island Hospital tested a possible remedy to the medication issue by offering addiction treatment in local pharmacies. In an article from January 2023 by NPR News' Martha Bebinger, "Offering addiction treatments in pharmacies could help combat the opioid crisis" . The focus of the article was on an innovative study by Genoa Health Care, a national pharmacy network. They studied patients' state of withdrawal related to their drug history and access to prescription on demand medication. During the initial visit, the pharmacist would call a physician or nurse who could write a prescription. Patients enrolled in these on demand pharmacies were 72% more likely to continue treatment for at least a month longer than patients who received treatment from more traditional treatment centers. The study's lead author, Traci Green, says" the study shows pharmacies with on demand access to these medications are an effective way to expand addiction treatment."

Virginia Code for involuntary mental health treatment does not distinguish between clients who are in crisis due to their substance use from other mental health conditions. Even for clients whose crisis is clearly known to be substance-related, there are currently few alternatives to psychiatric hospitalization.
Understanding the needs of consumers with substance use issues can help guide what services will improve their care and reduce the burden on the Commonwealth's hospital system. Implementation of this project will allow SUD patients to be treated in an appropriate facility which requires less expensive space and less expensive staffing requirements, thereby freeing expensive psychiatric beds for truly psychiatric patients.

According to the US Surgeon General's Addiction and Substance Misuse Reports and Publications, dated April 8, 2022, alcohol and drug misuse, and related disorders are major public health challenges that are taking an enormous toll on our society.

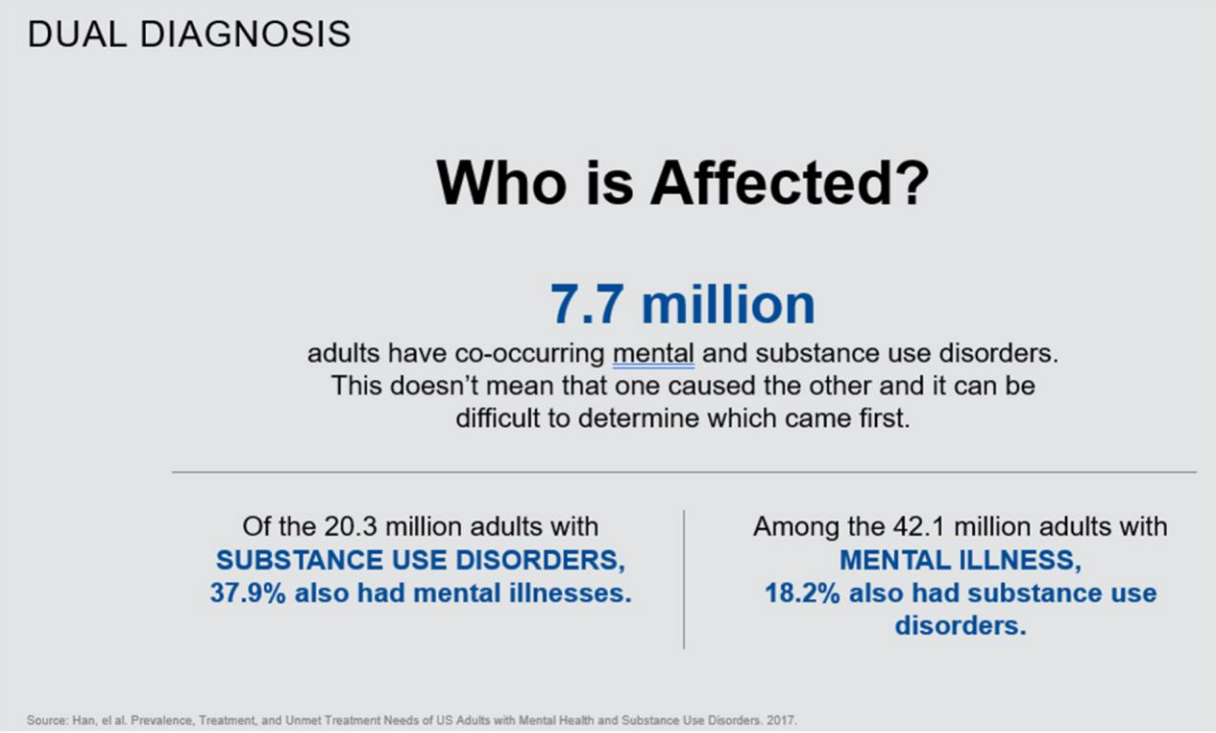
- The annual economic impact of substance misuse in the US is estimated to be $249 billion for alcohol misuse and $193 billion for illicit drug use; this equates to $8 billion of impact for the Commonwealth of Virginia.

- Nationally, over 23.5 million people suffer from a substance use disorder right now; 500,000 of whom reside in the Commonwealth of Virginia.

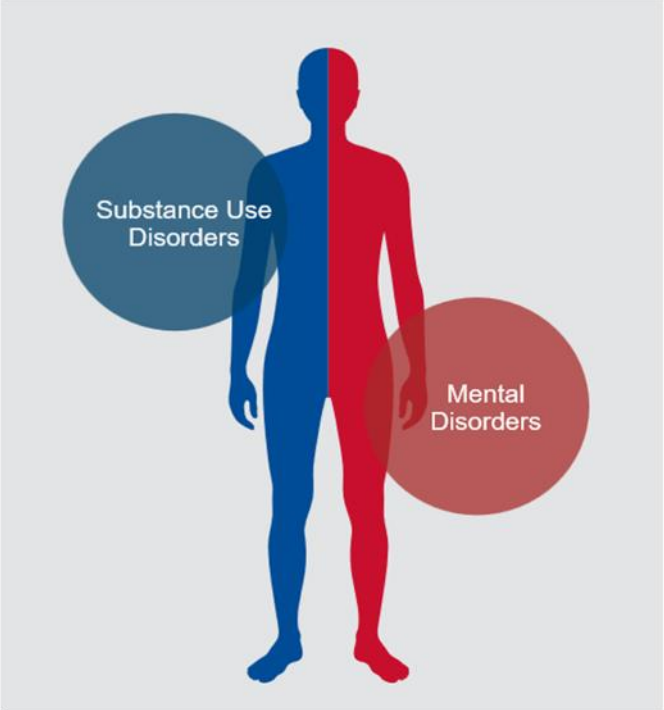
Alcohol and other drugs cost society roughly $442 billion every year in health care, lost productivity and criminal justice involvement; diabetes cost is half that amount.

The Appalachian region of Virginia, shown in the market services areas studied for this report, is expected to see a 37% increase for cases of substance use disorders, while the general population of the Commonwealth will only grow by 3% during that same period.

Opioids are of grave concern due to the record-breaking number of fatal overdoses in 2020. Fatalities were up by 47.5% from 2019 according to Virginia Department of Health's statistics.



Based on data obtained from various sources and DBHDS historical data, estimates of the demand for SUD services within the Catawba were used to determine the need and the best location to provide continuum of substance use disorder treatment services, given population size, location of the Commonwealth's hospital facilities, and availability of workforce. The current Catawba Hospital market areas, DBHDS regions 1, 3A, 3B, and 3C were used as a baseline for inpatient bed projections for substance use disorder diagnosis. The SUD facility would support patients with dual diagnoses, such as a person who experiences both a mental health issue and a substance use disorder concurrently, who significantly struggles with obtaining treatment in the private sector. This occurs frequently with substance use and mental disorders. Comorbidity also means that interactions between these two disorders can worsen the course of both. Today we know that individuals who are dual diagnosed with disorders who have successful and long-lasting recovery must be treated for both conditions at the same time.

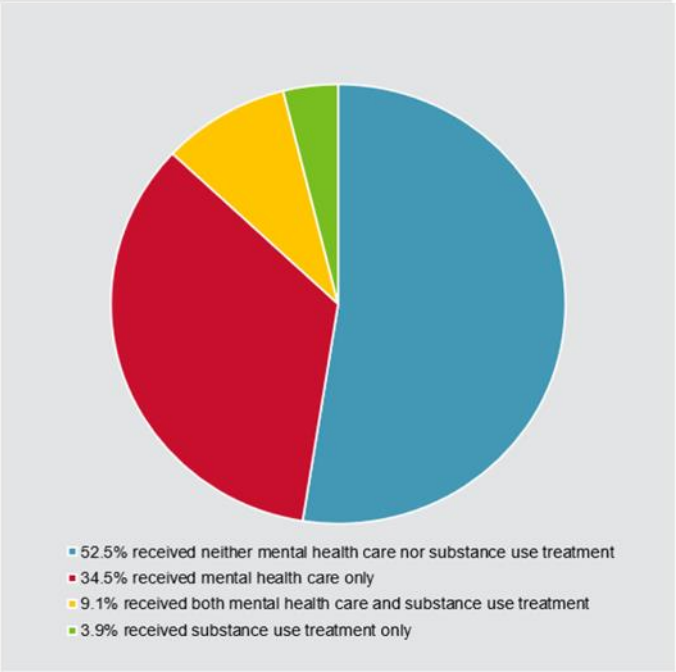


DUAL DIAGNOSIS

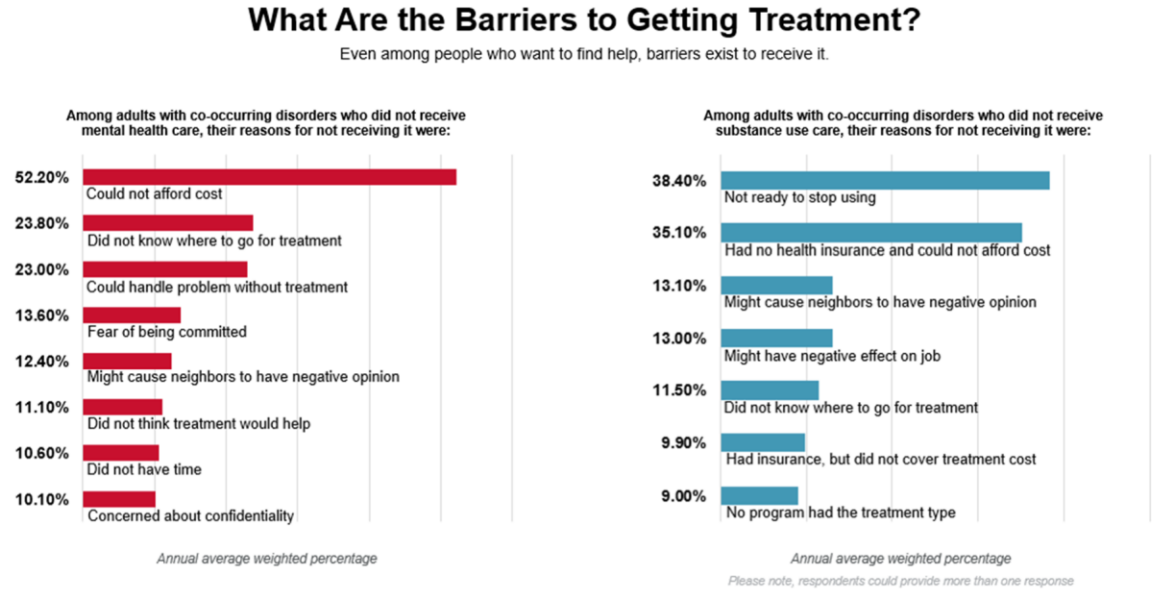
Who Gets Treatment?

There are many effective treatments for both mental and substance use disorders. A comprehensive treatment approach will address both disorders at the same time.

Not everyone with co-occurring conditions gets the treatment they need.



DUAL DIAGNOSIS



HDR considered whether the Catawba campus was the right location for this transformational model program with both Western State Hospital and Southwestern Virginia Mental Health Institute located in the valley and Southern Virginia Mental Health Institute located just outside the valley; however, the expansive Catawba campus provides considerable space to grow and is centrally located and less than 2 hours to the other 3 hospitals. In addition, it exists in a hub of education feeder schools for new staff.

SUD Residential Housing Looking North – Option

Visioning and Guiding Principles

An all-day visioning meeting was conducted on November 17, 2022, to determine the vision and principles for this project. The Department of Behavioral Health and Developmental Services (DBHDS), healthcare providers, and community stakeholders (both public and private) met to review and further define the project principles that would define success for the project. Both near- and long-term visions were determined as well as the development of metrics to determine the program's success. During meetings with DBHDS and various CSB representatives during April and May of 2024, the vision and principles resulting from the original session remain valid and continue to be desired.

Visioning Process

The visioning participants were divided into three groups. Each group was asked the same questions or were asked to perform the same activity. Once the groups completed the task, all participants were reassembled to ascertain each group's perspective and then achieve consensus on the vision or principles the exercise was designed to elicit.

The full details of the visioning session are provided in Appendix A. Appendix A-1 provides the full-size readable charts used in the visioning session.

Guiding Principles

To develop the guiding principles for the transformed Catawba Hospital campus, four questions were asked to the three groups:

Question 1: When you open the doors 5 years from now, how will you evaluate your success?

Question 2: In 10 years from now how will you evaluate success?

Question 3: What do you see as the roadblocks in accomplishing that success?

Question 4: Are there any issues or topics that are off limits as we facilitate the user group activities?

The results of the exercise are below.

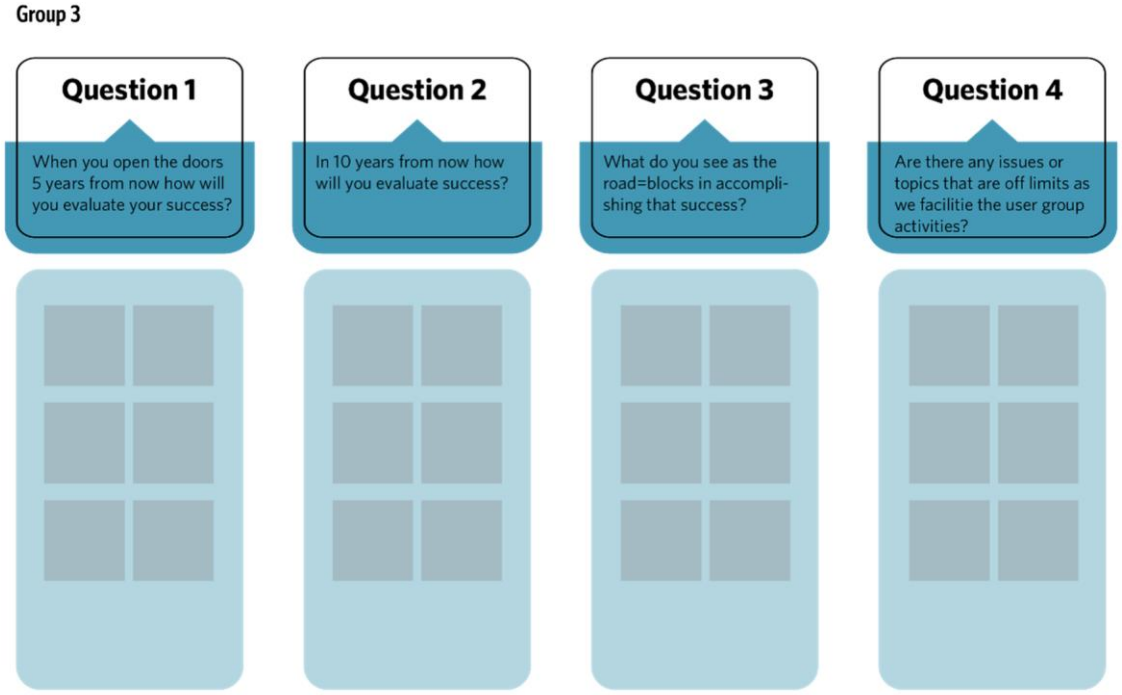
Near Term Goals (Next 5 Years)

The groups articulated similar needs, issues, specific measurements of success, and gaps across the behavioral health service continuum. In all cases, participants articulated the need

for a safe treatment environment that is flexible to therapeutic needs and could improve treatment using new biotechnology. The system of care and the service outlets within it recognized the need to recruit staff and retain them for long-term success. When all these elements are in place, participants noted metrics that would reflect their progress as:

- decreased length of stay,
- reduced readmissions,
- lower missed appointment rates,
- improved discharge planning,
- a safe treatment environment that flexes with the therapeutic needs,
- use of biotechnology to improve treatment, and
- recruitment and retention of staff.

Defining the Guiding Principles



Long Term Goals (Next 10 Years)

For many participants, near term goals resembled long-term goals. Defining the needed infrastructure and filling in service gaps is anticipated to be an ongoing process. The role of technology and data captured from it was a reoccurring theme in the framing of success over the long-term. Participants noted the value of virtual-based care and apps designed to support treatment plans. Data capture and analysis has been cited as impactful to the quality of care and participants seemed to recognize that as well.

Research and innovative biotechnologies will push forward substance use disorder treatment and Catawba Hospital should be leading the effort. Resources needed to improve outcomes may be supported both by data and by service infrastructure. Participants noted the need for

advanced treatment standards, recovery housing, vocational rehab, and advances in the way methamphetamine and opioid disorders are treated. Some felt there was an opportunity for the partnership to serve as a national model for care. A few felt the 700-acre campus as a single location for all continuum of care services was the path to achieve that goal. As within the five-year success conversation, the value of family and peer-supported care was central to patient treatment and prevention success. Apart from building upon the five-year goals, long-term goals would include:

- Integrating treatment with a chronic disease model of care that supports and guides the patient from clinical management to more self-management of their disease.
- Elements of support include advanced treatment standards incorporating technology,
- Vocational training, and
- Intermediate housing.

BARRIERS TO SUCCESS

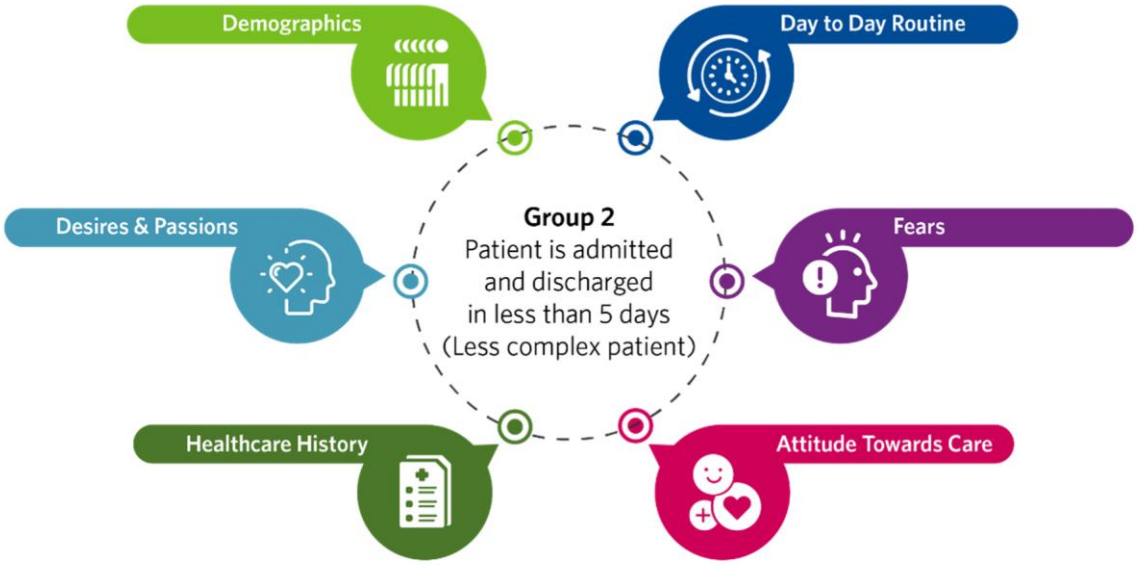
Identifying what could limit the success of the imagined community partnership revealed a broad spectrum of uncertainty. Starting from the inside out, the Catawba campus itself generated concerns about how it could migrate away from historical misuse and misconceptions including the perception as a place where law enforcement could drop-off individuals without penalty. The Catawba facility's ability to function beyond its regulatory-mandated use was articulated as a federal, state, and local challenge.

Some participants noted changing regulatory and legal statutes could complicate how the hospital in the partnership could function and how they define themselves as a unified body. Still, the way the collaborative defines its mission could support advocacy and lobbying efforts while potentially offsetting or softening regulatory and mandated use guidelines. Addressing things like disclosure of admission justification and community support of service development via an advocacy platform could counter some of the potential challenges articulated by participants.

Activity 1 - Future Scan
Goal: Through active participation, the groups will identify upcoming trends in behavioral health and addiction treatment in the healthcare industry.

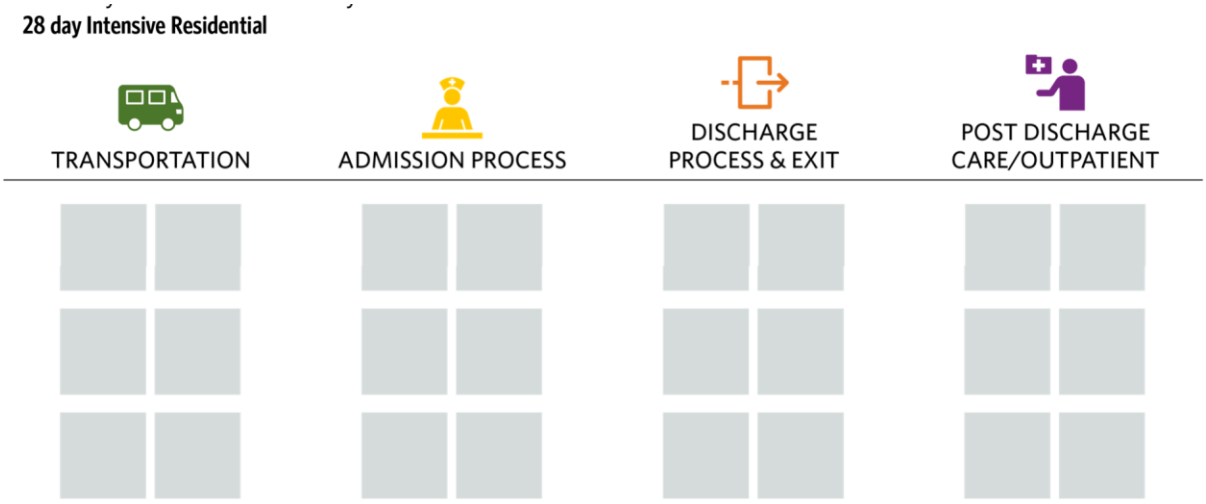
Activity 2A – Patient Personas
Goal: The goal is to broadly understand the needs of our patients/users and how the system can work to meet those needs. Through small group breakout sessions, we will use patient personas relating to the voice of the customer. This will help gain, assess, and better understand their needs and desires in the delivery of healthcare from their inpatient stay through outpatient services and connection to ongoing care near their home community.

Activity 2A: Patient Personas



Goal: The goal is to broadly understand the needs of our patients/users and how the DBHDS system can work to meet those needs. What do the other hospitals in the Virginia state system and other facilities in Virginia need to do to help move addiction patients through their patient journey?

Activity 2B: Patient Journeys



Activity 3 – Vacation Analogy
Goal: Through small group active participation, groups create an understanding of what the new Catawba Campus and DBHDS Health system of the future could look like through an operational lens using various non-healthcare system platforms as an analogy.

Activity 3: Vacation Analogy

Group 1

Activity 4 – Exploring Standardization

Goal: The goal is to have participants think outside of the healthcare industry and consider which companies exemplified a predictable customer experience through its standards.

Activity 5 - Start/Stop/Enhance

Goal: This activity required identifying what items/actions/activities in the Catawba Campus and DBHDS Health system need to be stopped, what items should be enhanced upon and developed further, and what things should be started in the progression and growth of specific institutes.

Activity 6 – Prioritize Metrics

Goal: The goal is to identify and prioritize metrics by which the effectiveness of the transformation could be measured.

The various activities were designed to have participants think strategically about the transformation, the patient's experience and needs, and what would constitute success. Outpatient and community-based services were heavily noted in both the measurements of success and barrier conversations. These services were emphasized as a need, but how to develop them emerged as a concern. Finding an operator to establish services like recovery venues, transportation services and other needed resources might require a strong business case for new market entrants or with the expansion of services should they exist. Staffing for these services and others across the care continuum is a threat not just for this group but across the nation. Technology is viewed as a release valve to staffing pressures but whether patients and caregivers have broadband access to tap into technology-based solutions presents its own challenge. Cross-training of staff was suggested as a means for bridging labor gaps and for those areas where technology cannot help. Ultimately, developing a financially viable community-wide system of services free of stigma was the hope of many.

The American Society for Addiction Medicine Continuum of Care for Adult Addiction

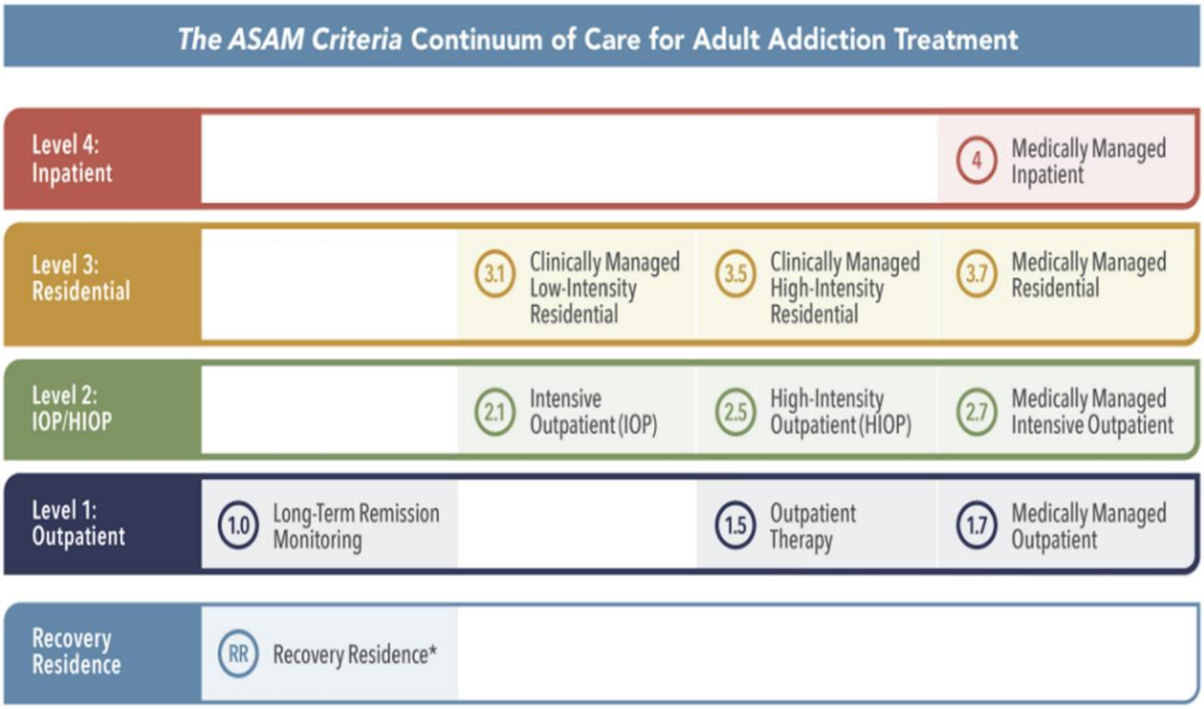
The American Society for Addiction Medicine (ASAM) established codes for each step of the continuum to standardize the way addiction treatment is viewed. ASAM released its new 4th edition in October 2023, replacing the 3rd Edition. Currently the 3rd Edition is widely used throughout the industry. It will take time for the 4th Edition to be fully implemented and during the transition, efforts should be made to confirm whether 3rd edition or 4th edition terminology is used.

Rehabilitation facilities address clients in different ways. ASAM's definitions make it easier to put services in two different facilities in the same context. This makes billing easier for insurers and provides guidance to the addiction treatment community on the most effective ways to assess and treat patients at each level. The scale ranges from 0-4, with 0 signifying no treatment at all, and 4 being the highest level of care in the industry.

Major changes in the 4th Edition reflecting the evolving treatment system include:

- Removing level .5 and reframing early intervention and prevention as a comprehensive response to addiction, not part of specialty addiction treatment
- Integration of biomedical and withdrawal management into the continuum of care alongside psychosocial services (".7" in each level)
- Eliminating the 3.3 level of care and incorporating treatment of individual with cognitive impairments across the continuum.
- Supporting access to recovery residence and defined criteria for recommending recovery housing in addition to outpatient levels of care.
- Access and availability of recovery support services either directly or through partnerships at each level of care
- Adding two sub-levels: Co-occurring Enhanced (COE) and Co-occurring Capable (COC). COE programs are those that have enhanced resources to routinely serve patients with more serious co-occurring mental health or cognitive conditions. COC programs are those that can address patients with co-occurring mental health concerns, including trauma, in the routine course of addiction treatment.

ASAM Criteria Continuum



<u>Level 1: Outpatient Services</u>

In Level 1 care, patients participate in outpatient services and long-term remission monitoring. Outpatient services are popular options for individuals who are further along in their recovery and want to integrate back into the community environment. Outpatient treatment can be a good first step for people who meet the criteria for mild substance use disorder and are healthy enough to be independent throughout the day.

Patients can continue maintaining their daily routines and live at home or in a recovery residence while attending outpatient appointments. They can schedule outpatient appointments at any point in the day to best fit their schedule. Outpatient treatment consists of regularly meeting with recovery support groups one to two times per week, physician or medical professional during the week, as well as having access to various therapies, clinical services, recovery support options (such as peer support services) and receiving medications.

For care to be considered outpatient at level 1, patients must spend less than 9 hours at the treatment facility during a given week (not including Level 1.0).

<u>Changes in Level 1 in the 4th Edition include:</u>

- Level 1.0
    - Reflects a chronic care model of treatment with ongoing/long-term remission monitoring for patients in stable remission, including ongoing medication management services for those prescribed addiction medicines.
    - Recovery management plan, recovery management checkups.
    - ASAM criteria recommends no limits on the length of stay.

- Level 1.5: Outpatient Therapy
- Level 1.7: Addition of medically managed outpatient

Level 2: Intensive Outpatient (IOP) or High Intensity Outpatient (HIOP) Services

Level 2 involves services where patients are not residents of a treatment facility but still spend a significant amount of time in a location receiving therapies and treatment that supports recovery. Individuals may transition to level 2 after participation in more intensive level 3 services OR the individual's level of care assessment indicates they need more care for their substance use disorder than what can be received in level 1 outpatient treatment.

Intensive outpatient and high intensity outpatient services provide more resources for patients than traditional outpatient treatment.

Level 2.1 is IOP, which is more than 9 hours of intervention. Many of these programs take place before or after work or school so that patients can receive treatment while remaining integrated in society. Level 2.5 is HIOP (formerly PHP/Partial Hospitalization/Day Treatment), which involves 20 or more hours of care per week without the around-the-clock attention of residential care. Both of these levels of care can be combined within a recovery residence.

Changes in Level 2 in the 4th Edition include:

- Partial Hospitalization/Day Treatment is now called HIOP.
- Addition of 2.7, medically managed intensive outpatient.

Level 3: Residential/Inpatient Services

Level 3 includes a scale of residential treatment that progresses from medically managed residential, to high intensity residential to low intensity residential. These patients tend to struggle outside of a supervised environment and need around-the-clock supervision to progress through recovery. Residential services are ideal for patients that will benefit from having access to the multidisciplinary team, including medical staff and mental health professionals, while they reside at the treatment facility.

Treatment centers that can provide various levels of residential treatment to accommodate multiple types of patients ensure they have the right resources to provide the best residential care.

Levels 3.1 and 3.5 describe different intensities of clinically managed residential care, while level 3.7 indicates the need for 24/7 medically managed care.

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Changes in Level 3 in the 4th Edition include:

- Level 3.1 = Clinically managed low intensity residential 9-19 hours of clinical services, formal assessments at least monthly
- Level 3.5 = Clinically managed high intensity residential, 20+ hours per week of clinical services, available 7 days a week
- Level 3.7 = Updated level 3.7 to medically managed residential to reflect care in residential settings and removing the "inpatient" terminology.

Level 4 Medically Managed Inpatient Services

Typically delivered in a general hospital or inpatient specialty addiction treatment program, Level 4 patients (the highest level of the ASAM scale) require medically managed intensive inpatient services. This stage includes medical detoxification and may include the initiation of medication-assisted treatment (MAT). Patients who begin treatment with intense withdrawal symptoms typically need help going through the detoxification process.

Medically managed intensive inpatient services are similar to the care patients receive at medical hospitals for acute medical cases. Patients will have access to 24/7 care for the duration of their treatment. Withdrawal symptoms can be dangerous or life-threatening, and this level of care can help individuals start their recovery safely.

Level 4 Psychiatric Services

In the 4th Edition, ASAM added psychiatric inpatient units and hospitals as part of the addiction continuum, labeled "Level 4 Psychiatric" to contrast with biomedical units that are labeled as Level 4 programs/services. Specific service standards for Level 4 Psychiatric are listed and are in addition to the standard services expected in Level 3.7 programs. The Level 4 Psychiatric service level should be able to provide the equivalent of 3.7 intoxication, withdrawal management, and addiction treatment services.

A Personal Journey to Care

Below is a fictional story of how an addict could enter the continuum of care that this new facility will offer to those in need of supportive treatment. Below is a person's journey from addiction to treatment and continuing care.

Matthew's Persona; Male, 45, single, retired military, currently unemployed, prior licensed mechanic, long term addict and is behavioral complex

Precipitating Event

After being hit by a car when crossing a busy intersection, Matthew was admitted to an emergency room. Upon assessment, he not only had several physical injuries, but it was determined that he was under the influence of substances at the time of the accident. He was admitted to the hospital to care for his injuries. After about 24 hours, he became increasingly agitated and anxious and started showing symptoms of paranoia. It was determined that Matthew was experiencing withdrawal from methamphetamine and a substance-induced psychosis.

Referral

Matthew was referred to, and transferred to, the new SUD Inpatient Hospital on the Catawba Hospital campus. Prior to this program being available, it is likely that he would have been placed

in a locked psychiatric unit at Western State Hospital, Southern Mental Health Institute, or another psychiatric hospital due to few alternatives being available at the time. This would not only have been more costly, but it would not address all of the specific issues Matthew was facing. Without receiving comprehensive treatment for the complex issues, (physical injuries, drug withdrawal, and psychosis), Matthew would be at risk for future readmission.

Initial Assessment

Upon admission to the new SUD Inpatient Hospital, Matthew was immediately assessed and triaged to the 4.0 ASAM level of care due to his complex needs that included ongoing medical care for his physical injuries, medical withdrawal management, and close observation of the substance-induced psychosis.

In his assessment, Matthew revealed a long history of substance use, including heavy use of methamphetamine for the past year. He also had an extensive history of involvement with the legal system including many arrests and two episodes where he spent time in jail, all substance related. He had little family support and was "couch surfing" with friends and anyone that would let him stay. On occasion he experienced homelessness when he was unable to find housing. He disclosed that he was a disabled veteran with several combat exposures and was discharged from the military 2 years prior. He was receiving VA Disability Compensation, which he mainly used to purchase drugs.

Course in Residential Treatment

In the 4.0 level of care Matthew had close observation, withdrawal management, and treatment. His physical injuries continued to need daily attention and his withdrawal symptoms peaked during his first six days, including vivid dreams, sleeplessness, fatigue, and anxiety. He received several adjunctive medications to help with the withdrawal symptoms and his substance-induced psychosis cleared at day six, with psychiatric assessment concluding no ongoing psychosis was present. He was diagnosed with Severe Stimulant Use Disorder, Moderate Cannabis Use Disorder, as well as PTSD and Major depressive disorder (recurrent, moderate). During these six days, Matthew had ongoing assessment as well as individual sessions with his counselor, who was dually licensed in both SUD and mental health, including trauma. He was unable to attend group or community interventions due to the intensity of his withdrawal symptoms.

At day 7, it was determined that Matthew no longer needed the 4.0 level of care and was ready to step down to a less intense program. Due to his ongoing medical issues and continuing low level of withdrawal symptoms, it was determined that Matthew would continue treatment in the 3.5 COE program to have the wrap around, on-unit services he required to continue his progress. He began attending group and community interventions and continued individual work with his counselor along with medication management from his psychiatrist on the unit.

At day 16, Matthew's physical issues were resolved, his mental health had begun to stabilize, and ongoing longer term withdrawal symptoms no longer required medical intervention. It was

determined he was ready to move to the 3.5 COC Residential on the Hill program where he would continue to receive 24/7 clinical management.

Matthew remained in the Residential on the Hill 3.5 program for 10 days, at which time his progress and symptomology indicated he was ready to step down to the 3.1 longer-term residential program. Here he would continue to receive the clinical care needed while working with his treatment team on a plan to re-integrate into his community. Matthew and his care team were able to locate a supportive housing program and facilitated his transition there after it was determined he was ready to leave the 3.1 level of care.

Course in Outpatient Treatment and Beyond

At the time of transition from Residential on the Hill, Matthew also transitioned to 2.5 High Intensity Outpatient (HIOP) level at the new SUD Outpatient Clinic, taking part in several VA support services, as well as starting to attend several Narcotics Anonymous (NA) meetings per week. He also began working with a Peer Recovery Coach who was also a veteran. This provided the structure and support needed while he began his re-integration to the community. He participated in HIOP for three weeks and then stepped down to 2.1 IOP where he remained there an additional four weeks. During that time, Matthew was able to find employment and began reconnecting with his sister, who had previously been estranged. Family services were arranged to support and encourage this positive relationship. Matthew then transitioned from IOP to attending two times a week 1.5 level outpatient groups, as well as continuing individual therapy and medication management. He continued to work with his Peer Recovery Coach for ongoing recovery checkups.

Conclusion

Matthew remained in comprehensive co-occurring services for over 90 days, which research indicates increases positive outcomes. This long-term continuum of care, with decreasing levels of intensity as symptoms decrease and recovery capital increases, is much less costly than revolving door episodes in psychiatric hospitals, ERs, and jail that would have likely resulted due to complex needs not being met in a way that complimented medical, mental health, and substance use diagnosis. All services were provided at the new Catawba campus and this increased the likelihood of highly coordinated care with warm handoffs to increase engagement and lower AMA departures. This comprehensive continuum of care fills the gaps to match the care with the needs of the patient over time. It offers better outcomes and better lives for the constituents of Virginia that are desperately in need of these services.

Law Enforcement and its Nexus to SUD Treatment

Impacts of Virginia's Temporary Detention Order Law on Substance Use Disorder and Mental Health: A Focus on Law Enforcement

In the Commonwealth of Virginia, the Temporary Detention Order (TDO) law plays a crucial role in addressing mental health crises, including substance use disorders and behavioral health issues. Virginia's TDO law empowers authorities to detain individuals, who, due to a mental illness, are deemed to pose a significant risk to themselves or others or are unable to care for themselves. This legal mechanism enables the involuntary hospitalization of individuals in crisis, ensuring they receive necessary mental health evaluation and treatment. This section explores the implications of Virginia's TDO law on these conditions, specifically examining its impacts on law enforcement, associated costs, officer training, The Marcus Alert System, and the overall effectiveness and challenges posed by the law.

What is a Temporary Detention Order?

A TDO is a legal document issued by a magistrate or court that authorizes the temporary detention of an individual for up to 72 hours (or up to 96 hours for juveniles) in a mental health facility for evaluation and treatment. The order can be issued if a person has a mental illness and if there exists a substantial likelihood that, as a result of mental illness, the person in the near future will:

- Cause serious physical harm to himself or others as evidenced by recent behavior
- Suffer serious harm due to his lack of capacity to protect himself from harm or to provide for his basic human needs
- Needs hospitalization or treatment
- And is unwilling to volunteer or incapable of volunteering for hospitalization or treatment

In Virginia, the TDO process often includes an Emergency Custody Order (ECO), although this is not required in order to issue a TDO. An ECO allows law enforcement officers to take an individual into custody for up to eight hours while a mental health evaluation is conducted by a certified preadmission screener (typically a CSB employee). If the evaluation determines that the individual meets TDO criteria, the preadmission screener conducts a bed search. If no bed is found at a non-state inpatient unit/facility, the state hospital is determined to be the facility of temporary detention (per Virginia law). To obtain a TDO, the magistrate is contacted and petitioned for the TDO. Once the magistrate issues the TDO, law enforcement executes this TDO by taking the individual into custody. At that time, the individual is either transported to the TDO facility, or continues to remain in custody with law enforcement while awaiting a bed at the facility of temporary detention. In some cases, even when the facility of temporary detention does not yet have a bed, law enforcement still chooses to transport the individual to the facility. These are referred to as “law enforcement drop offs”, and solely impact state hospitals.

In 2021-2022, Virginia issued 21,099 TDOs, highlighting a significant need for mental health crisis intervention. Individuals under TDOs for which the state hospital is the facility of temporary detention, faced an average wait time of 43 hours for placement. This reflects systemic inefficiencies. To address these challenges, Governor Youngkin launched the Prompt Placement TDO Task Force to streamline the TDO process and reduce waiting times, which are crucial for effective intervention and patient care.

Process and Legal Framework for Emergency Custody and Temporary Detention Orders

The process usually begins in one of three ways: a citizen has concerns about another citizen in a mental health crisis, petitions their magistrate for an ECO, and law enforcement brings that person into custody; a law enforcement officer encounters someone that they believe meets criteria for an ECO, and takes them into custody; or an individual may present to a CSB, crisis program, or emergency department in crisis, and it is determined that a preadmission screening is necessary. ECOs allow for an individual to be held in custody for up to eight hours for evaluation. During this time, they must be assessed by a certified preadmission screener. These evaluations most often take place in a hospital emergency department.

It should be noted that every dollar spent on increasing access to care for substance use disorders results in a savings of $11 *($4 in health care costs and $7 in criminal justice costs).*

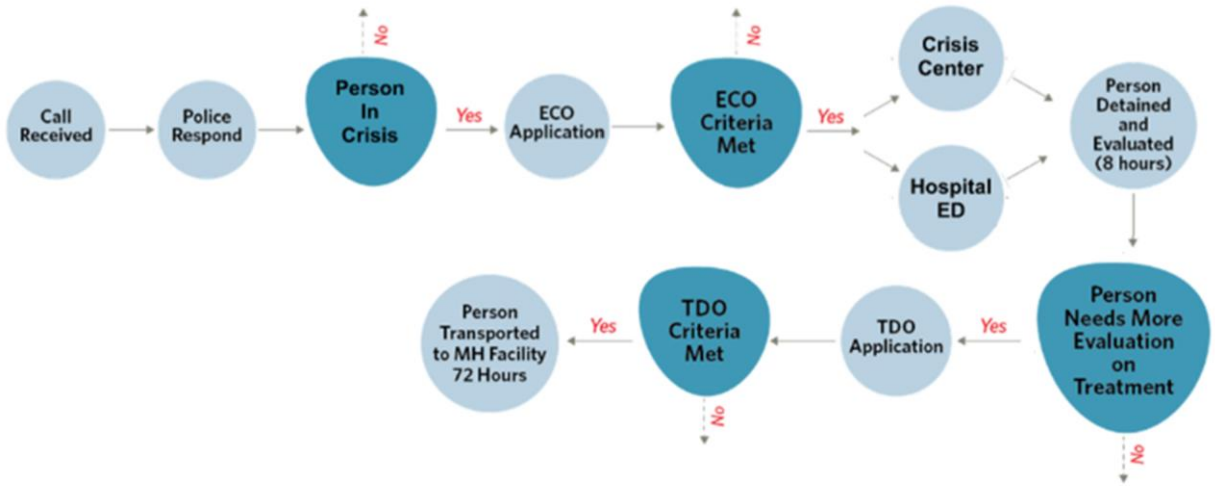
Certified preadmission screeners evaluate an individual's behavior, mental status, potential threats to safety, and gather information from collateral sources. If the determination is made that an individual meets criteria for a TDO, the preadmission screener commences with a search for an inpatient bed. In Virginia, the law states that if no other inpatient bed can be found, the state hospital will be the facility of temporary detention; this law is often referred to as the "Bed of Last Resort law".

In most cases, if an individual is determined to meet TDO criteria, it is the certified preadmission screener that petitions for the TDO. This petition is more detailed and requires a stronger justification for continued detention. It must clearly demonstrate that the individual meets specific legal criteria for involuntary detention, such as being a danger to themselves or others or being unable to care for themselves due to their mental condition. The petition for a TDO is then presented to a magistrate. If the magistrate finds that the evidence and circumstances justify further involuntary detention, they will issue a TDO. This order allows for the individual to be detained for a longer period, generally up to 72 hours for adults, in a mental health facility. This period is used for further evaluation, stabilization, and beginning appropriate treatment. Upon issuance, the TDO is executed by law enforcement. At that time, the individual is either immediately transferred to a mental health facility, or they continue to remain in law enforcement custody until an inpatient bed becomes available. Once they arrive at the mental health facility, they will remain under observation and receive necessary mental health services.

The transition from an ECO to a TDO is a critical juncture in the process of addressing severe mental health crises. It ensures that individuals who cannot make safe decisions for themselves due to their mental condition receive the necessary care and supervision while also maintaining legal safeguards to protect their rights. The judicial oversight in the issuance of a TDO ensures that this significant step of involuntary detention is justified and conducted in a fair and lawful manner.

In individual is in custody under an ECO and the evaluation is not completed within the designated 8-hour timeframe, several actions may be taken. In some cases, the magistrate may be petitioned for a second ECO. This requires sworn testimony to a magistrate, and may be denied, depending on the magistrate and locality. In general, once the ECO period ends, and if there is no TDO obtained, the individual must be released. These steps are designed to ensure a balance between protecting the individual's rights and addressing their mental health needs effectively.

ECO and TDO Flow Process



Impacts on Substance Use Disorder and Behavioral Health

The TDO process significantly impacts individuals with substance use disorders and behavioral health issues. Substance use disorder is characterized by a pattern of substance use that leads to significant impairment or distress. In cases where individuals are unable to seek treatment voluntarily, TDOs provide a legal mechanism to ensure that those at risk of harming themselves or others receive the necessary evaluation and care. The TDO process involves multiple stakeholders, including healthcare professionals, law enforcement officers, and judicial authorities, to identify, evaluate, and transport individuals in need of urgent intervention.

TDOs ensure individuals receive immediate and appropriate care, which can be lifesaving. However, this process also raises ethical concerns regarding individual autonomy and consent. Furthermore, logistical challenges and limited psychiatric bed availability often place a strain on

law enforcement and healthcare systems. Positive and negative impacts of TDOs on individuals with substance use disorders and behavioral health issues include:

Positive Impacts

- Timely Intervention: TDOs provide a rapid response to individuals experiencing acute mental health crises, including those related to substance use disorders, preventing potential harm.
- Access to Treatment: TDOs facilitate access to critical mental health services and resources, ensuring individuals receive the care they need to address their conditions effectively.
- Quicker access to Care: TDOs ensure individuals in crisis receive prompt evaluation and treatment, potentially saving lives.
- Reduced Emergency Room Burden: Direct transportation to mental health facilities alleviates pressure on emergency departments.
- Community Safety: TDOs help prevent violent incidents by temporarily detaining individuals who pose a danger to themselves or others.
- Law Enforcement Support: Officers appreciate the TDO process as a legal framework that empowers them to act decisively in crisis situations.

Negative Impacts

- Stigmatization: Stigmatization from TDOs can lead to negative labeling and deter individuals with mental health issues, including substance use disorders, from seeking voluntary treatment. This stigmatization arises from the involuntary nature of these interventions and can result in individuals being labeled negatively.
- Limited Autonomy: Involuntary hospitalization through TDOs may impinge on individual autonomy and raise ethical concerns about the balance between intervention and personal freedom. In addition, being placed under a TDO can have long lasting impacts, such as showing up on some background checks for jobs and limiting a person's ability to possess firearms.
- Strain on Law Enforcement: The custody and transportation burden and time commitment affects officer availability and department budgets.
- Bed Shortage: Limited psychiatric and SUD beds often force officers to maintain custody of individuals while awaiting an available bed and awaiting to transport individuals long distances, exacerbating the strain on law enforcement.
- Revolving Door Effect: Individuals often return to their communities without adequate follow-up care, leading to repeated TDOs and further straining law enforcement resources.

Impacts on Law Enforcement

The Temporary Detention Order law significantly impacts law enforcement agencies in Virginia. Officers are often the first responders to mental health crises and are tasked with ensuring individuals posing a risk to themselves or others receive appropriate care. However, this

responsibility comes with several logistical and operational challenges. From training requirements to the burden of custody and transportation, officers are often overextended as they navigate the complexities of the TDO process.

Costs and Hours:

Maintaining custody while awaiting inpatient beds and transporting individuals under TDOs to private and state hospitals across Virginia imposes a significant burden on law enforcement in terms of time, personnel, and costs. Extended custody and travel times frequently lead to overtime hours, which increases departmental operational costs. Custody and transport duties divert officers from their primary patrol responsibilities, leaving departments short-staffed. Officers also frequently spend several hours waiting for inpatient beds to become available, resulting in extended resource constraints on law enforcement as well as treatment delays for the individual in crisis. Arranging custody and transportation between multiple agencies or facilities can also lead to logistical complications and further delays.

Additionally, transporting individuals in crisis poses significant safety risks for law enforcement officers, especially if the individual becomes combative or attempts self-harm. Officers must remain vigilant against suicide attempts or other self-harm behaviors during transport, increasing stress and liability. Furthermore, police vehicles lack the specialized equipment of medical transport vehicles, leaving officers ill-prepared to handle severe crises. This combination of extended custody and travel times, coordination challenges, and safety risks makes the TDO process resource-intensive for law enforcement agencies.

Training Programs:

To handle mental health crises effectively, law enforcement officers require specialized training, including knowledge of crisis intervention techniques and de-escalation strategies.

- Academy Level: Police academies equip officers with foundational knowledge of mental health laws and crisis management techniques, preparing them for real-world scenarios involving TDOs. Virginia's Department of Criminal Justice Services (DCJS) mandates that police academy recruits receive training on mental health issues, the TDO process, and de-escalation techniques. However, the training may lack depth due to limited instructional time. Recruits undergo role-playing exercises involving crisis scenarios but often face unrealistic conditions that do not reflect the complexities of real-world situations. Training quality varies between academies due to a lack of standardized curriculum specifics, resulting in differing levels of preparedness among new officers.

  Post-Academy Training: Ongoing training programs, like Crisis Intervention Team (CIT) training (see below for more details), offer officers advanced skills in de-escalation, communication, and empathy to handle complex mental health situations with sensitivity. Departments typically offer refresher courses on mental health issues as part of annual in-service training, but these courses are often brief and overshadowed by other priorities. Some departments implement specialized protocols for TDO cases but may not uniformly apply them, leading to inconsistencies in response strategies. Many agencies face funding and staffing challenges that limit their ability to offer

comprehensive training beyond basic requirements.

The challenges associated with training highlight the importance of standardized, comprehensive mental health training programs for law enforcement officers involved in the TDO process.

Crisis Intervention Team Training:

Crisis Intervention Team (CIT) programs are a progressive approach to improve interactions between law enforcement and individuals experiencing mental health crises. Following a tragic incident in Memphis, Tennessee, in 1988, CIT programs were developed to address the need for more effective and compassionate law enforcement responses in situations involving mental health issues. The concept quickly gained traction as a model for enhancing the safety and outcomes of both police officers and individuals in crisis.

The foundation of CIT training is a comprehensive 40-hour course that patrol officers undergo to become certified CIT officers. This training covers several crucial areas:

- Recognition of Mental Illness: Officers are trained to identify signs and symptoms of mental illnesses, enhancing their ability to understand the behaviors and needs of individuals in crisis.
- Psychopharmacology: Understanding common medications used in the treatment of mental health conditions, their effects, and potential side effects is crucial for officers to gauge the medical needs and behaviors of individuals they encounter.
- On-site Visits to Local Mental Health Facilities: These visits help officers familiarize themselves with the mental health resources available in their community and build relationships with healthcare providers.
- Crisis De-escalation Skills: Officers learn specific techniques to safely de-escalate situations that could otherwise result in harm to the individual or the officer.
- Defensive Weapons Training: This training ensures that officers can protect themselves and others with minimal reliance on force.

Upon completing this training, officers return to their regular patrol duties, but with the added responsibility of responding to specific mental health crises. Calls involving serious mental health issues are coded as CIT calls and dispatched specifically to CIT officers. This targeted approach ensures that trained personnel handle potentially volatile situations, thereby increasing the likelihood of a safe and effective resolution.

Another critical component of CIT is the collaboration between law enforcement agencies, mental health professionals, and community advocates. This partnership aims to create a more informed, integrated approach to handling mental health crises, ensuring that individuals receive the help they need rather than undergoing unnecessary incarceration. This collaborative

network also facilitates a more efficient use of resources by directing individuals to appropriate health services instead of the criminal justice system.

By the time CIT was introduced to Virginia in 2001 with the establishment of the New River Valley Crisis Intervention Team, the framework had already proven its effectiveness in various parts of the country. These programs have not only improved safety during police interactions but also fostered a broader understanding of mental health issues within the law enforcement community. Positive and negative outcomes include:

Positive

- Enhanced De-escalation Capabilities: CIT-trained officers are better equipped to manage confrontations without escalation, minimizing injuries.
- Reduction in Officer Injuries: CIT training has been associated with an 80% reduction in officer injuries during mental health crisis calls. This statistic underscores the program's effectiveness in enhancing officer safety during potentially volatile situations.
- Identification of Non-arrest Alternatives: These officers can often divert individuals to appropriate mental health services instead of the criminal justice system, aligning outcomes more closely with health needs.
- Cost Savings: By diverting individuals from jail to community-based treatment, CIT programs can generate significant cost savings. For instance, in Detroit, the cost of community-based mental health treatment is approximately $10,000 per year, compared to $31,000 for incarceration. These savings demonstrate the financial benefits of effective mental health crisis intervention
- Improved Community Relations: The community often views CIT-trained officers as more empathetic and skilled, which can strengthen public trust.
- Stronger Inter-agency Collaboration: CIT enhances cooperation among police, mental health services, and community groups, leading to more coordinated care.
- Effective Crisis Management: Officers are better prepared to handle crises, potentially reducing the public and personal health costs associated with these incidents.
- Improved Response Times: Communities with CIT programs report a reduction in the time officers spend responding to mental health calls, allowing them to return to their primary duties more quickly. This efficiency helps maintain public safety while addressing mental health crises more effectively.

Negative

- Inconsistent Participation: Since CIT training is not mandatory, not all officers receive it, leading to potential disparities in how mental health crises are handled.
- Resource Constraints: Smaller departments may face challenges in funding and allocating time for CIT training.
- Lack of Uniformity in Training: Without statewide mandates, the quality and extent of CIT training can vary significantly across different regions.

Despite its benefits, CIT training is not mandatory in Virginia, highlighting the need for broader implementation to improve mental health crisis responses statewide. Overall, CIT programs highlight a proactive and humane approach to law enforcement's engagement with mental health crises, promoting safer, more effective interactions through specialized training and community collaboration.

The Marcus Alert System

In response to the challenges posed by the TDO process, Virginia has implemented the Marcus Alert System, named in honor of Marcus-David Peters, a young Black man experiencing a mental health crisis who was fatally shot by police in 2018. The system aims to reduce law enforcement involvement in behavioral health crises by establishing a more comprehensive crisis response network that includes behavioral health professionals. The program is now available in 10 localities including regions in Western VA, Northern VA, Southwest VA, Central VA, and Southeast VA. By 2026, all Virginia localities are required to have Marcus Alert systems functioning. One of the key goals of the Marcus Alert System is to reduce the role of police in behavioral health crises, shifting the primary response to qualified behavioral health professionals. This approach aims to decriminalize mental health crises and reduce stigma. The system is designed to increase public confidence in calling for help during a mental health crisis, ensuring that the response is appropriate and does not result in unnecessary involvement of law enforcement.

Key components of the Marcus Alert System:

- Regional Crisis Call Centers: Call centers serve as the primary point of contact for crisis response, providing real-time de-escalation, assessment, and triage to behavioral health professionals or law enforcement as needed.
- Mobile Crisis Teams: These multidisciplinary teams, consisting of behavioral health professionals and peers with lived experience, respond directly to individuals in crisis, reducing the need for law enforcement intervention.
- Crisis Stabilization Services: Crisis stabilization units provide short-term care for individuals in acute crisis, offering an alternative to hospitalization.
- Law Enforcement Protocols: When law enforcement involvement is necessary, protocols ensure officers with specialized training (such as CIT) are dispatched to the scene, minimizing the risk of escalation.

The Marcus Alert System improves crisis response by reducing the burden on law enforcement, as behavioral health professionals lead crisis interventions, allowing officers to focus on their primary duties. The system prioritizes de-escalation and treatment, reducing the risk of violent confrontations and enhancing safety. Additionally, Mobile Crisis Teams and crisis stabilization services provide immediate care, helping individuals avoid unnecessary hospitalization. Overall, the Marcus Alert System offers a comprehensive framework that prioritizes behavioral health care while minimizing the need for law enforcement involvement, ultimately leading to better outcomes for individuals in crisis and the communities they live in.

Conclusion

Virginia's Temporary Detention Order law plays a crucial role in safeguarding individuals experiencing mental health crises, including those with substance use disorders and behavioral health issues. While TDOs ensure timely interventions and access to care, they also pose significant challenges, particularly in terms of law enforcement's resource allocation and training needs. The current lack of mandatory Crisis Intervention Team training, coupled with the burden of custody and transportation, places logistical and financial strains on police departments. To mitigate these challenges, Virginia must prioritize comprehensive reforms. Enhancing CIT programs, standardizing mental health crisis training, and increasing psychiatric bed availability will help alleviate the logistical and financial burdens on law enforcement while improving outcomes for individuals in crisis. Additionally, fostering a holistic approach to mental health crisis response, as exemplified by the Marcus Alert System, can reduce the reliance on law enforcement and promote more compassionate care. The Marcus Alert System represents a significant step forward, providing a comprehensive framework that prioritizes behavioral health care while reducing the burden on law enforcement. By expanding CIT training, improving crisis response protocols, and increasing access to specialized care, Virginia can ensure safer and more effective outcomes for individuals in crisis and the officers tasked with helping them.

Data Sourcing

Catawba Hospital is collaborating with its sister facilities across DBHDS regions 1, 3A, 3B, and 3C to develop a substance abuse solution along with a residential treatment component. Validating and scaling the magnitude of need across a ten-year horizon requires developing a demand model that incorporates a variety of data sources. This report section describes the data sources used by the HDR Advisory Services team who specialize in strategy and analytics and developed the model used to quantify key planning units (KPUs).

The HDR analysis is focused on adult patients with substance use disorder and those with co-occurring conditions. Catawba Hospital and DBHDS leaders have asked that certain kinds of SUDs be considered as highly treatable when developing program scale. Those conditions, as stated in the RFP, include cannabis, stimulants, and alcohol. Catawba leaders also asked that the study address pregnant women with SUD.

Data Sources

The data sources used in this analysis include:

DBHDS reports: Catawba Hospital representatives and its Community Services Board (CSB) partners shared a variety of routine reports to convey patient utilization metrics. These reports included Region 3A and 3B SUD Liaison Reports for FY 21 – FY 22; Western Region SUD Liaison Reports for FY 20 – FY 23; excerpts and screenshots of operational dashboards; emails and links to a residential treatment locator; and reports on SUD patient volume for Catawba Hospital (CH), Southwestern Virginia Mental Health Institute (SWVMHI), Western State Hospital (WSH), and Southern Virginia Mental Health Institute (SVMHI); aggregated length of stay metrics stratified by adult and geriatric age cohorts; and a CSB-based definition of the targeted market.

Summary of Volume Metrics for Targeted Facilities

VOLUME PROFILE					Post COVID TDO Change			
SUD Discharges (All Types)	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24 (Proj)	FY 22-24 Trend
Catawba Hospital	**308**	**298**	**243**	**172**	**214**	**242**	**248**	
Southern VA MHI	211	241	204	186	116	71	98	
SW VA MHI	458	491	418	455	407	353	224	
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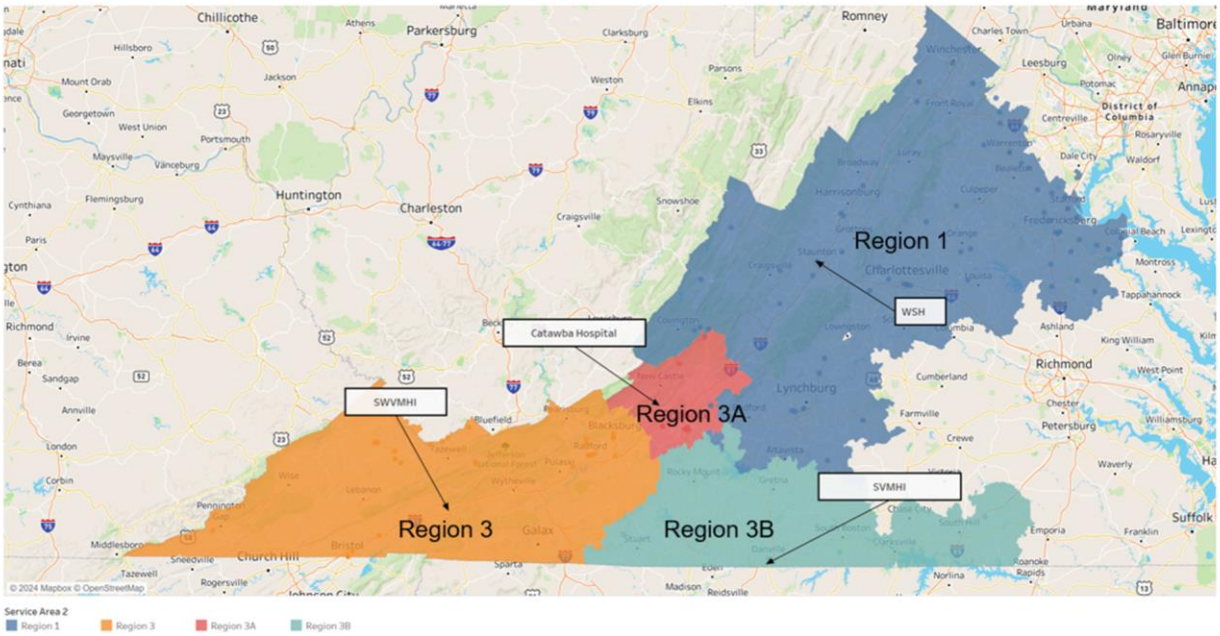
Civil SUD Admissions								
Catawba Hospital	**291**	**295**	**227**	**151**	**86**	**59**	**160**	
Southern VA MHI	209	240	192	179	99	66	88	
SW VA MHI	97	286	280	259	123	134	140	
Western State Hospital	311	310	306	389	12	115	68	
Civil as % of Total SUD								
Catawba Hospital	**94%**	**99%**	**93%**	**88%**	**40%**	**24%**	**65%**	
Southern VA MHI	99%	100%	94%	96%	85%	93%	90%	
SW VA MHI	21%	58%	67%	57%	30%	38%	63%	
Western State Hospital	78%	71%	69%	59%	4%	60%	65%	

Source: Catawba Hospital Generated Reports. Received April 17, 2024; HDR Advisory Services Analysis

Eighteen CSBs were determined to be in the catchment area of proposed SUD treatment facilities which include Region 1, Region 3A, Region 3B, and Region 3C:

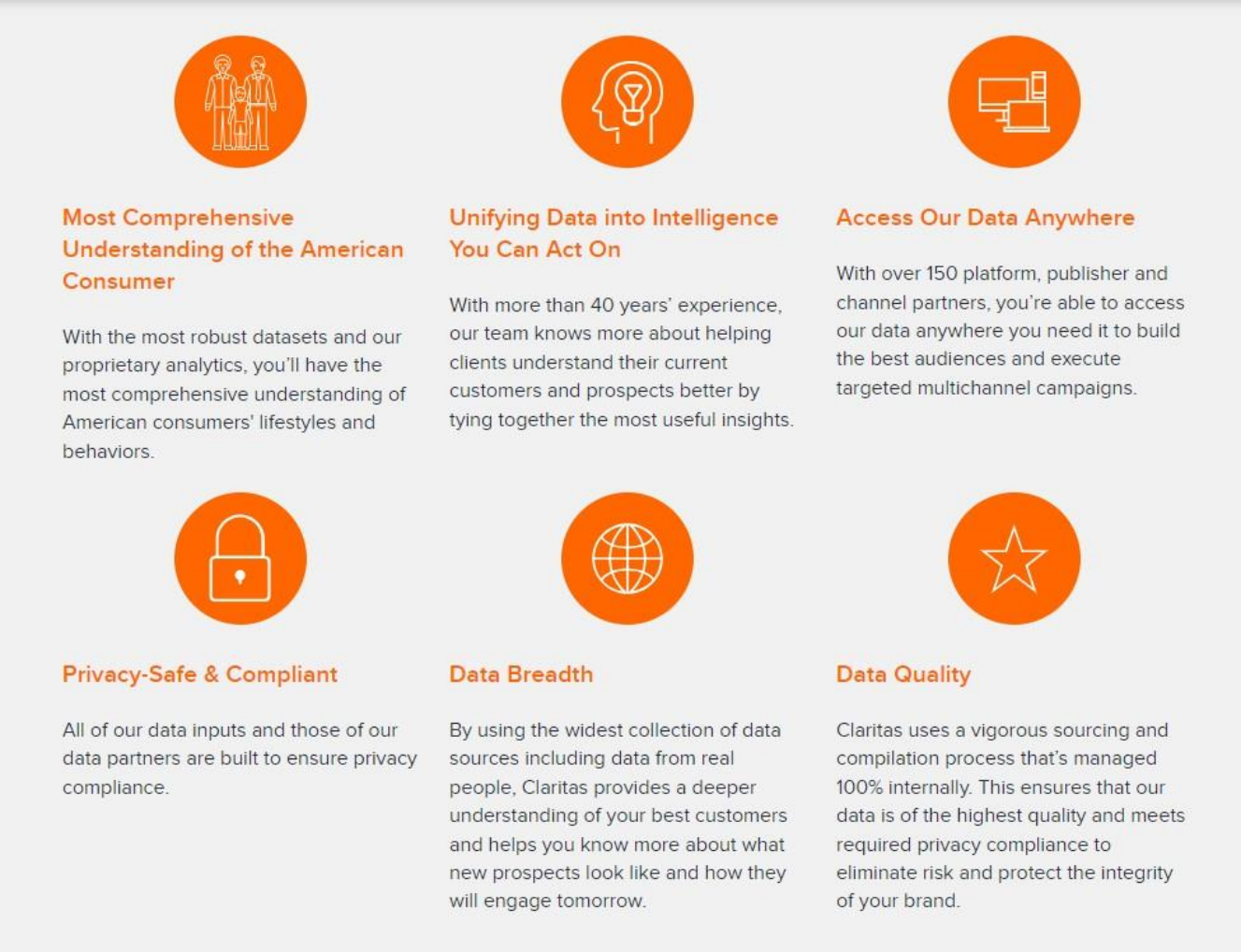
Alleghany-Highlands	Blue Ridge	Cumberland Mountain
Danville-Pittsylvania	Dickenson	Encompass
Harrisonburg-Rockingham	Highlands	Horizon
Rappahannock Area	Region Ten	New River Valley
Northwestern	PD1	Piedmont
Rockbridge	Southside	Valley

Target Facilities within Market and CSB Service Areas.



Appendix B lists the counties and cities associated with each of the CSBs.

Claritas data: Zip code level demographic and socioeconomic data support market sizing by quantifying the 2022 residential population estimate (based on the 2020 decennial census) and a 2031 forecast. These data will be used to describe which communities are growing or declining and incorporate those growth factors into the KPU calculation model. This dataset will also be used to estimate the number of women of childbearing age (18-44) to support an analysis of SUD service consumption.

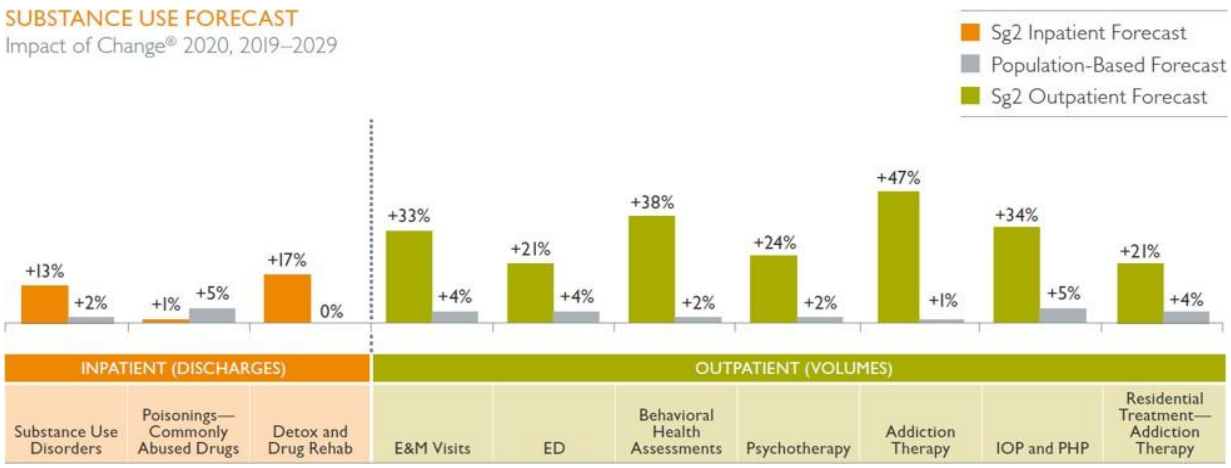


Sg2 Market Estimate: HDR purchases data from a long-standing industry vendor for healthcare strategic data and insights called, Sg2, a Vizient company. The first Catawba Hospital analysis relied on data produced by Truven, an IBM Watson company. Since the last study, Truven was purchased by Sg2 (Vizient). The Sg2 dataset provides current and future inpatient demand estimates based on a Diagnosis Related Group (DRG) billing codes for a defined market (geography). Separately from its demand forecast, Sg2 provides industry insights highlighting trends and evolving practice patterns that contribute to KPU model refinement. Using both disease-based and DRG-based analyses, the forecast provides a comprehensive picture of how patients will access inpatient and outpatient services along the continuum of care. The level of

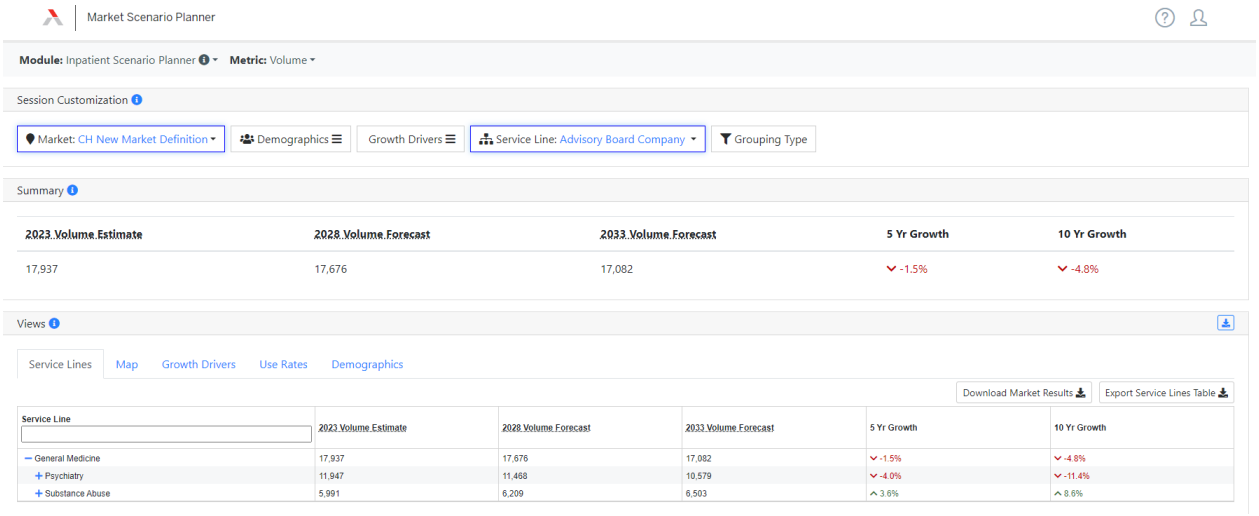
care model developed by Sg2 considers a variety of factors including population, epidemiology and sociocultural changes, economy and consumerism, policy, innovation and technology, and systems of care.

Sg2 produced its first substance abuse forecast in 2000 which considered changes in service demand across a continuum. The image below depicts the current Sg2 forecast for substance abuse.

Forecasts suggest Outpatient Substance use Care to Outpace Inpatient Volumes



Advisory Board Market Scenario Planner: Another long-standing healthcare data vendor is the Advisory Board. HDR can access an estimate of inpatient market demand through a Market Scenario Planner tool. The Market Scenario Planner allows users to customize projections according to five key growth drivers: disease prevalence, care management, insurance, readmissions, and technology shifts. With no adjustments, the output applies national assumptions to the market. The image below provides a sample of the kind of estimates generated by the Advisory Board and is for illustrative purposes only.



Other Sources: Various statistics and benchmarks obtained from reports and research articles published by federal and state agencies, professional organizations, and not-for-profits were used throughout this analysis. They include, but are not limited to, Substance Abuse and Mental Health Services Agency (SAMHSA), National Institutes of Health (NIH), Centers for Disease Control and Prevention (CDC), Centers for Medicare & Medicaid Services (CMS), Agency for Healthcare Research and Quality (AHRQ), Department of Health and Human Services (HHS), and The Virginia Department of Behavioral Health and Developmental Services (DBHDS).

One particularly useful information source applied to the SUD facility KPU model(s) was the Treatment Episode Data Set (TEDS) produced by the Center for Behavioral Health Statistics and Quality branch of SAMHSA. The 2021 report(s) accessed by the HDR Advisory Services team helped generate a crude use rate based on United States data which was then applied to the market definition provided by Catawba Hospital and DBHDS leaders. It is a common practice to develop population-based use rates then apply them to markets of interest. All demand estimates begin with some sort of population-based use rate. These estimates can then be incorporated into models where special considerations can be evaluated. Below is an image of a sample TEDS report.

Table 2.12a. Education, marital status, living arrangements, pregnancy status, and veteran status among admissions aged 18 years and older, by primary substance use: Number, 2021 (continued)

Education, marital status, living arrangements, pregnancy status, and veteran status	*All admissions aged 18 years and older*	*Primary substance use at admission*												
		Alcohol		*Opiates*										
		Alcohol only	*With secondary drug*	*Heroin*	*Other opiates*	*Cocaine*	*Mari-juana/ hashish*	*Metham-phetamine/ amphet-amines*	*Tran-quil-izers*	*Seda-tives*	*Hallu-cino-gens*	*Phen-cycli-dine (PCP)*	*Inhal-ants*	*Other/ none speci-fied*
Living arrangements														
Independent living	765,587	170,986	120,974	157,015	71,532	40,071	77,137	92,948	9,182	1,617	1,074	2,171	397	20,483
Dependent living	180,456	26,545	25,319	36,762	15,699	10,882	15,268	37,938	2,025	295	340	656	124	8,603
Experiencing Homelessness	201,228	34,025	37,639	46,615	12,613	13,701	8,384	39,255	1,722	240	327	735	84	5,888
No. of admissions	1,147,271	231,556	183,932	240,392	99,844	64,654	100,789	170,141	12,929	2,152	1,741	3,562	605	34,974
Pregnant (female only)														
Yes	12,687	675	820	3,229	1,712	666	1,524	3,160	122	23	20	57	1	678
No	439,651	68,064	47,668	74,341	39,169	21,964	30,554	66,109	4,264	894	470	1,185	249	84,720
No. of female admissions	452,338	68,739	48,488	77,570	40,881	22,630	32,078	69,269	4,386	917	490	1,242	250	85,398
Veteran														
Yes	35,663	10,628	6,105	5,368	2,399	2,387	2,430	4,442	245	63	46	26	17	1,507
No	1,139,113	217,715	175,250	237,843	101,993	62,236	98,149	163,720	12,792	2,107	1,695	3,647	582	61,384
No. of admissions	1,174,776	228,343	181,355	243,211	104,392	64,623	100,579	168,162	13,037	2,170	1,741	3,673	599	62,891

NOTES: Based on administrative data reported to TEDS by all reporting states and jurisdictions. The data items in this table are Supplemental Data Set items, which are reported at each state's option.

SOURCE: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration, Treatment Episode Data Set (TEDS). Data received through 10.18.22.

Other statistics evaluated and used in the SUD facility analysis include metrics related to length of stay. The “mean” metric blends in outlier cases into its measure of length of stay. While mean, or average, length of stay is commonly used in general acute care analyses, substance abuse cases seem better suited to the “median” metric. A median number finds that midway point in a series of values. Substance abuse cases are subject to wide variability, so a median value helps “center” the estimate of patient stay duration. Below is a table featuring length of stay metrics from the TEDS dataset for reference. Resources like this, plus feedback from Catawba Hospital leaders and stakeholders and HDR-retained subject matter experts, help refine the demand model to generate KPUs used to scale the project to best suit the long-term needs of the market.

The following graphic outlines the framework for estimating market size and case acquisition. The framework also highlights considerations with patient duration or length of stay. Other factors impacting KPU calculation include readmission rates, waitlists, and potential unmet demand. Like with market sizing and length of stay, secondary research is employed to develop adjustments to the model. Finally, capacity targets are established at three distinct levels to describe how many patients the facility can safely support at any one time. It is typical to have some sort of “buffer” or number of beds/spaces to accommodate surges, but prolonged high-rate occupancy is potentially a safety risk. Overall, this is the framework for calculating KPUs and the resources used to develop and refine the model. The full data and resulting outputs are included in Appendix B.

Length of Stay by Type of Substance US Treatment Services in 2021

Type of Treatment Service	Length of Stay* in Treatment (number of days)			
	Mean	P25	Median	P75
MAOT Outpatient	304	15	81	298
Ambulatory – Non-Intensive Outpatient	146	1	50	143
Rehabilitation/Residential – Long Term	135	12	35	89
Ambulatory – Intensive-Outpatient	86	8	41	99
MAOT Detoxification	40	3	5	9
Rehabilitation/Residential – Hospital	37	3	6	22
Rehabilitation/Residential – Short Term	25	7	19	28
Ambulatory – Detoxification	21	2	3	6
Detoxification, Free-Standing Residential	11	2	4	6
Detoxification, Hospital Inpatient	7	3	4	5
Total	124	3	25	98

*Length of stay (pertaining to the retention in treatment NOM) is only available in TEDS discharges.

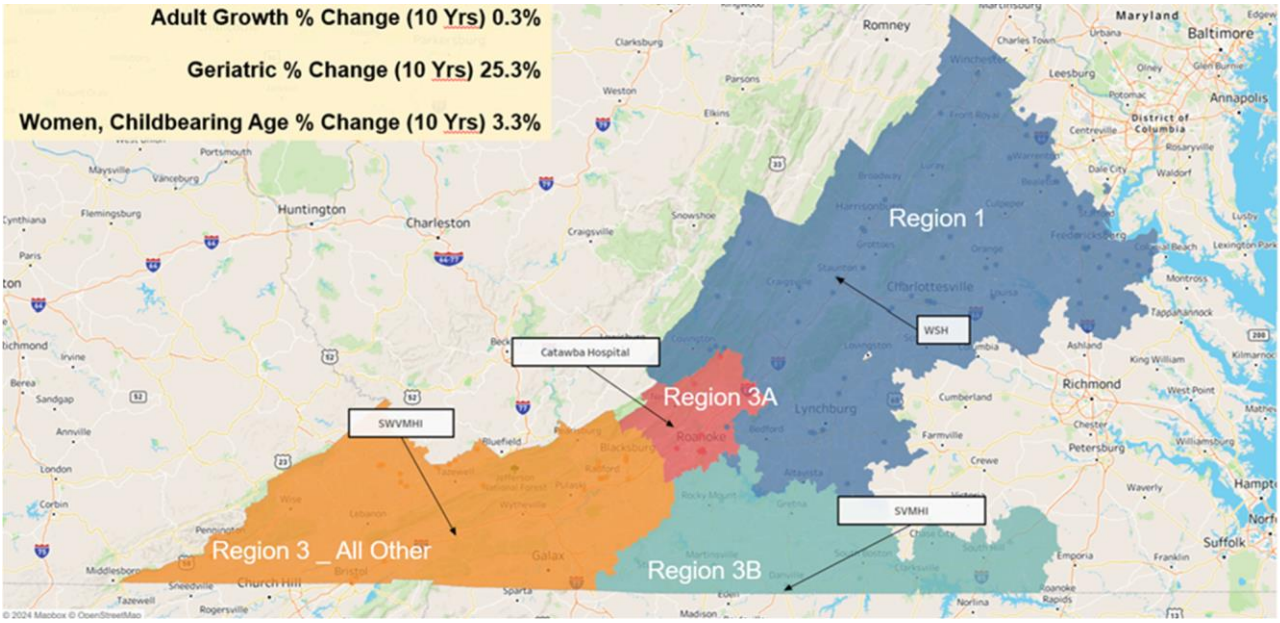
Data Analysis and Bed Needs

The data analysis part of the feasibility study for the new SUD facility explores the size of the market opportunity by treatment service against multiple case capture scenarios to develop Key Planning Units (KPUs) used to scale services. These treatment services align with the newly updated criteria for patient placement as defined by American Society of Addiction Medicine (ASAM). This helps with the transition and maintains continuity in the classification of patient types.

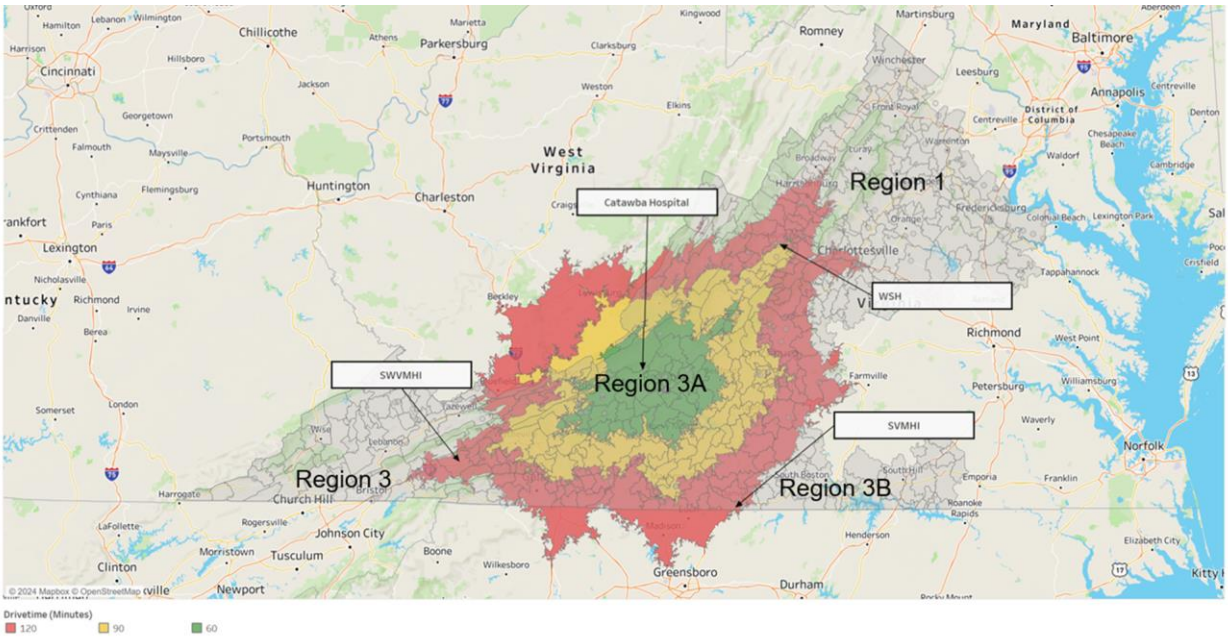
Targeted Service Area The service area (also referred to as market definition) supporting the feasibility of a substance use disorder (SUD) focused on the Catawba Hospital campus encompasses multiple DBHDS regions. These regions include Regions 1 and 3, which are home to multiple Community Services Boards (CSBs). The CSBs and their associated region are detailed in Appendix B. Within the service area definition there are four state psychiatric hospitals and these facilities become the focus of various facets of the analysis. They include Catawba Hospital (CH), Southwestern Virginia Mental Health Institute (SWVMHI), Western State Hospital (WSH), and Southern Virginia Mental Health Institute (SVMHI).

The following graphic outlines the geographic relationship between the four regions along with the psychiatric hospitals. Also noted on the map is a summary of the projected 10-year change for certain population segments. The feasibility study for the SUD facility focuses on the aged 18 plus population which is then segmented into “Adults” defined as individuals aged 18-64 and “Geriatric” which reflects individuals aged 65 and older.

Population Estimates For Targeted Facilities within Market



Target Facilities within Market based on Drive Time & Overlaid Regions



Pregnant Women with SUDs

Women's services are a special focus to DBHDS with an emphasis on pregnant women and women of child-bearing age. According to the DBHDS website, "…many women drink alcohol or use medications or illicit substances early in their pregnancy." Further, the DBHDS website indicates approximately 11% of pregnant women use alcohol, tobacco, and/or other mood-altering substances during pregnancy. To support the ongoing surveillance of need, pregnant women with substance use disorder are acknowledged in this report. This is accomplished by identifying the estimated number of women that fall under the traditional definition of adult child-bearing age (ages 18-44). Since this is a unique population subsegment already included in the broader residential population, estimates and national SUD utilization data suggests this group's medical needs lie primarily in the outpatient realm because it does not materially impact the calculation of KPU (bed) need.

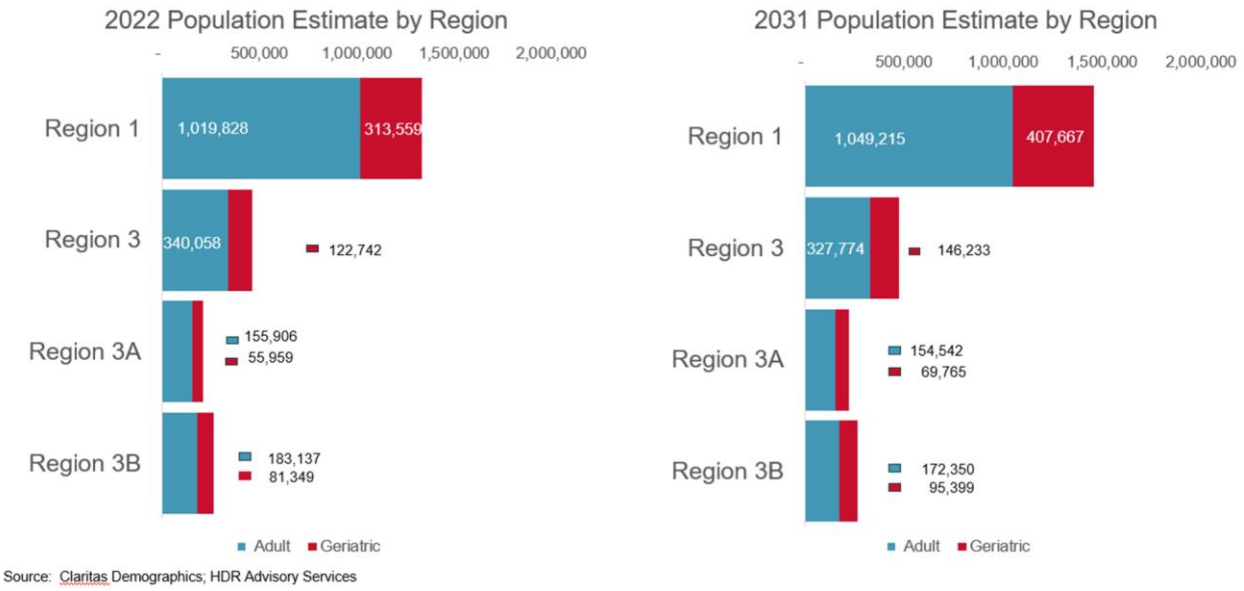
Furthermore, a section of the 2021 TEDS report documents the number of pregnant women receiving treatment for substance use disorders. Of the total number of adults over age 18 in the report, about 39% were women. Of those women, only 2.8% reported being pregnant during treatment. A substantial portion (37%) of these pregnant women seeking SUD treatment were associated with Ambulatory Outpatient Level 1.0 services. The TEDS data did not indicate how many, if at all, of pregnant women required inpatient care. The TEDS report also did not document cigarette use among pregnant women but did note alcohol and other substances used by the patient.

Service Area Residential Population

Understanding the local population is important when estimating case growth associated with population changes. Based on Claritas demographic reports for the defined service area, the 2022 estimated residential population for the age 18+ segment is just under 2.3 million. Across

the regions included in the service area, Region 1 is the most densely populated with over 1.3 million adults. Region 3A is the smallest with just under 212 thousand adults. The long-range rate of population growth across the regions varies. Regions 1 and 3A represent the highest rates of long-range growth with a projected 9.3 % in Region 1 and 5.9 % in Region 3A. The remaining areas, Region 3, and subregion 3B, both represent relatively small populations, and their projected population growth are both under 2.5% between 2022 and 2031. All regions across the service area reflect a combined projected long-range growth of 6.6%.

Population Estimates by Region, 2022 and 2031



Source: Claritas Demographics; HDR Advisory Services

Industry data suggests a higher number of SUD-related cases are associated with the adult population, ages 18-64, compared to the geriatric population. Region 1 has the highest number of adults aged 18-64 (76%) whereas Region 3B has the lowest (69%). Within the service area, the geriatric population shows a higher overall rate of growth. This means areas with a higher proportion of geriatric population growth may have higher numbers, but their association with SUDs are lower. The graphic outlines the distribution of the 18+ residential population by region.

Modest Overall Population Growth Forecast by Region, 2022, 2027 & 2031

Residential Population Estimate for Entire Area (2022): **2,272,538**

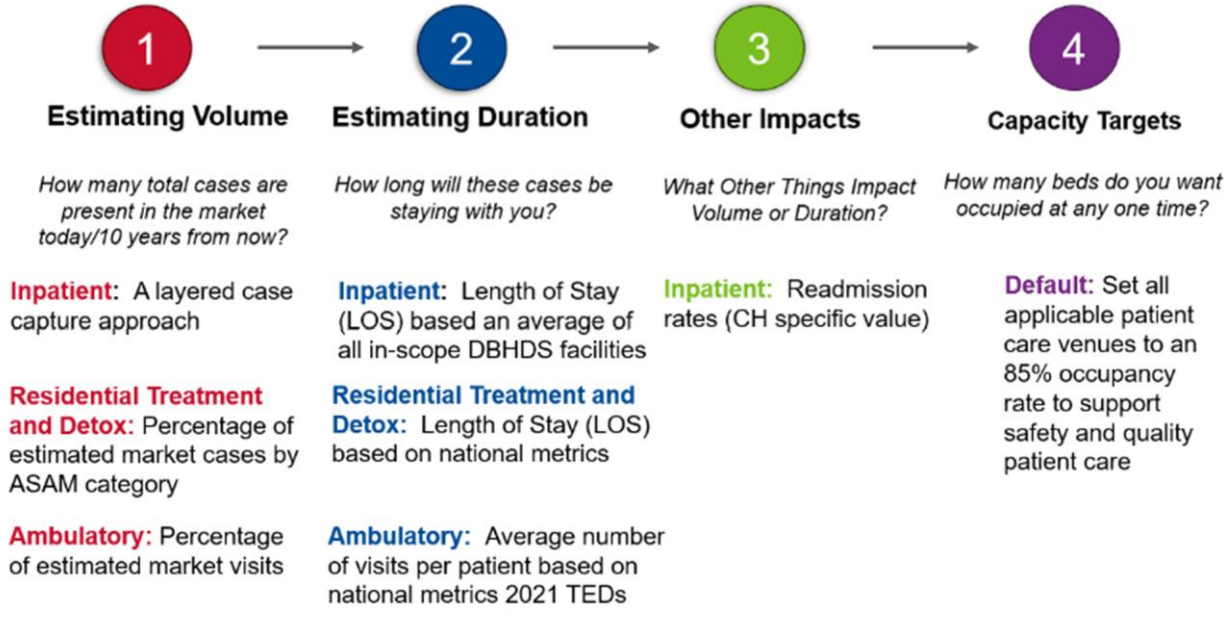
	Region 1	Region 3	Region 3A	Region 3B
2022 Age 18+ Population Estimate	1,333,387	462,800	211,865	264,486
2027 Age 18+ Population Estimate	1,401,976	469,020	218,777	266,265
2031 Age 18+ Population Estimate	1,456,882	474,006	224,307	267,689

Source: Claritas Population Estimates and Projections; HDR Advisory Services Analysis

Key Planning Units (KPUs) Calculation Methodology

Key planning units are a unit of measure within facility design and reflect the type of service to be delivered. In this instance, the KPUs represent beds. The number of KPUs needed to support the patient population considers how many cases the SUD facility can attract; how long these patients will occupy the beds; and how many patients the facility can treat on any given day as represented by occupancy rate. The graphic below outlines the process for developing KPUs with the emphasis on the case capture (volume) opportunity.

How Are SUD KPUs Developed?



The approach for estimating the number of cases the SUD facility can attract centers around various case capture scenarios. The scenario approach acknowledges there are no guarantees with case capture, but this is true with any healthcare feasibility study. Case capture scenarios employ a variety of methods to estimate the opportunity.

The inpatient calculation differs from the Residential Treatment, Detoxification (Detox) and Ambulatory ones because there is historical data available to incorporate into the model. Catawba Hospital leaders and stakeholders provided HDR staff with SUD case volume for each of the targeted facilities. The data provided by Catawba Hospital representatives spans between Fiscal Year (FY) 2018 to FY 24 6 months. A year-end projection for 2024 is calculated by doubling the six-month volume to estimate a twelve-month period. Not all data years are appropriate for study primarily due to the extraordinary circumstances associated with the COVID pandemic. For that reason, FY 22 to FY 24 projected year-end data years are isolated for closer evaluation. The following graphic reflects the volume information provided to HDR for analysis.

Summary of Volume Metrics for Targeted Facilities

VOLUME PROFILE					Post COVID TDO Change			
SUD Discharges (All Types)	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24 (Proj)	FY 22-24 Trend
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Western State Hospital	78%	71%	69%	59%	4%	60%	65%	

Source: Catawba Hospital Generated Reports. Received April 17, 2024; HDR Advisory Services Analysis

Another source of inpatient case volume is those attributed to population changes; this is referred to as “Organic Growth” because it is naturally occurring. Sg2, a healthcare data and intelligence company, predicts a 6.4% population-driven growth in cases between 2022 and 2031.

Volumes for the other service categories rely on crude use rates applied to the local population to estimate the size of the market. This is accomplished by extracting data from an industry recognized survey produced by the Substance Abuse and Mental Health Services Administration called Treatment Episode Data Set (TEDS). The TEDS dataset provides data on patient utilization across the United States. The 2021 dataset is the most recent available and the one heavily used in the analysis to develop population-based crude use rates. The resulting national crude use rates are then applied to current and projected residential population to

develop market size estimates for the defined service area.

Treatment duration is the next important data element in the KPU calculation model. In most general healthcare analyses, average length of stay is used, but the team decided to use median length of stay metrics to acknowledge variability in treatment duration. The inpatient length of stay (LOS) metrics provided by Catawba Hospital were aggregated across FY 18 to FY 24 (six months). The challenge with this data is they are aggregated across multiple data years. Had length of stay been provided by individual data year, the HDR team could have used them in the inpatient data model. Instead, the team used a median length of stay metric of 27 days suggested by Catawba Hospital and DBHDS representatives. For Residential/Rehabilitation treatment, Detox, and Ambulatory treatment categories, 2021 TEDS median length of stay metrics were used. For reference, the data provided to the HDR team is below.

FY18 to FY24 Aggregate LOS Data for all Discharges with SUD Diagnoses

Discharges by Age and LOS

For Discharges with SUD Diagnosis

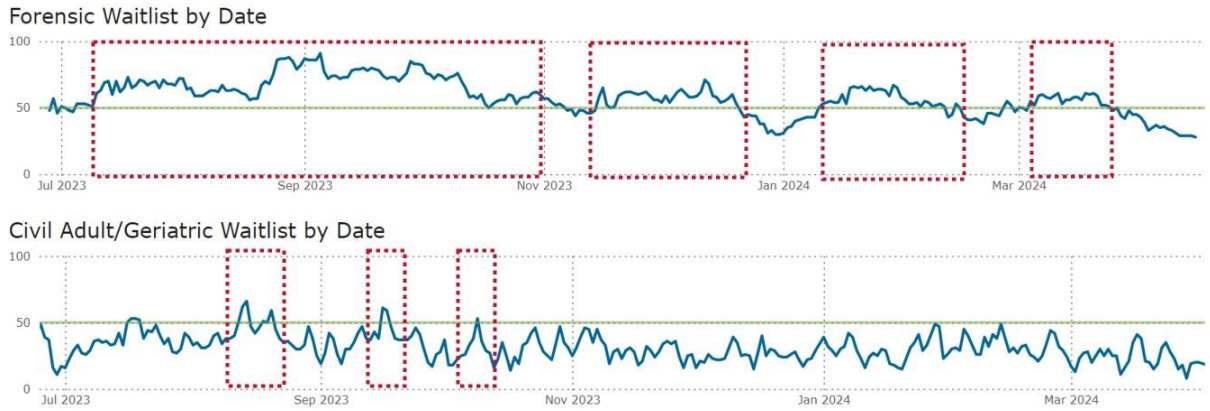
Facility	Age_Group	Count	Max LOS	Avg LOS	Median LOS
CAT	18 - 64	1,411	1,375	27.9	86.0
CAT	65+	190	970	73.6	69.5
SVMHI	18 - 64	1,075	576	32.9	67.0
SVMHI	65+	3	228	147.7	146.0
SWVMHI	18 - 64	2,595	3,957	36.7	121.0
SWVMHI	65+	99	2,926	195.4	94.5
WSH	18 - 64	2,447	2,478	41.0	120.5
WSH	65+	3	207	95.3	45.0
Total		**7,823**	**3,957**	**38.9**	**14.0**

For the inpatient KPU model only, “Other Impacts” integrate additional sources of case volume. These include readmissions and a flat estimate of how many cases community hospitals could shift or transfer to the SUD facility. The actual number of cases the community hospitals could shift is unknown. The inpatient KPU model integrates a tiered assumption of cases attributed to community hospitals. These assumptions range from 300 to 600 cases. This number could also potentially account for patients moved off the waitlist for service at the SUD facility. For reference, the following graphic highlights waitlist information provided to the HDR team for the entire Department of Behavioral Health and Development Services System.

DBHDS System Wide Waitlist – Pent Up Demand for Beds

Congested System Limits Access and Timely Delivery

Forensic & Civil cases trending over 50 at multiple points across a 10 month + timeframe



Source: Catawba Hospital provided data/graphics: Waitlist as of April 16, 2024

Capacity targets address the number of patients occupying KPUs at any one time. Discussions about which threshold to use have occurred over the course of the project. Early versions of the KPU model tested different capacity thresholds. A standard 85% occupancy rate was ultimately set for the KPU model because this allows the SUD facility room to accommodate volume surges and can provide a buffer of space for safer and efficient care.

KPU Estimates by Treatment Type

The following section will outline more details regarding the inputs and outputs of the KPU models built for Inpatient, Residential/Rehabilitation, and Detox. Of note, for Ambulatory care, only estimated visits will be calculated since this represents a non-bed based patient category.

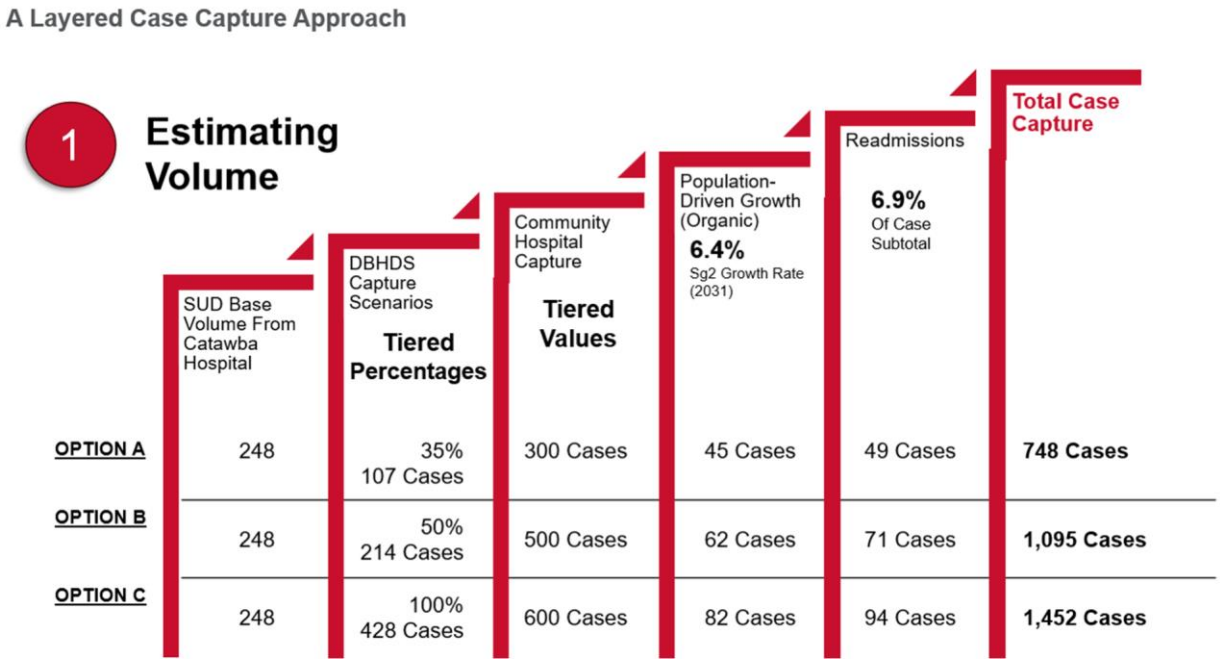
Inpatient

As previously stated, a layered approach to estimating case capture was developed so a variety of factors could be integrated. These factors are a mix of known metrics and assumptions. The base metric for the model is Catawba Hospital's SUD-volume for FY 24 projected year-end of 248 cases. Multiple opinions expressed by the HDR team and Catawba Hospital leadership suggest that there are patients who qualify for ASAM 3.5 level care yet occupy an inpatient bed because the correct kind of bed is not available. Without the certainty of how many Level 3.5 patients occupy a bed ideally suited for a Level 4.0 patient, no adjustment was made to the SUD inpatient bed model. Moving forward with this approach, three case capture scenarios from Catawba Hospital sister facilities were tested. The scenarios tested how many cases would come from the other in market DBHDS psychiatric hospitals were set at 35, 50, and 100% thresholds. Early versions of the model exclusively tested a 100% case capture from other DBHDS facilities under the premise DBHDS facilities fully control and would direct patients appropriate for care at the SUD facility, but there may be circumstances where some types of

cases are held back thus a tiered approach was developed. Similarly, the cases shifted from the community hospitals were calculated at tiered levels. In earlier iterations of the analysis, community hospital cases were modeled as a flat, estimated number.

There could be a variety of reasons why community hospitals may decide to transfer cases to the SUD facility. Any number attributed to community hospital shifts is speculative and, as such, it is more appropriate to represent them in a tiered fashion. Community hospital case capture thresholds are set at 300, 500, and 600 cases. Another source of case volume growth, population-driven or organic growth, is then calculated and applied to the case capture model. Since readmissions are an operational fact for every hospital, psychiatric or not, a 6.9% readmission rate is then applied to the new case volume subtotal. For clarity, the subtotal subjected to the 6.9% readmission rate includes Catawba Hospital's base volume, the corresponding DBHDS case capture, and then the community hospital case shift. The resulting total estimated number of cases which could be captured by the SUD facility is then used to develop an estimated readmission case count. The resulting amount is 49, 71, and 94 cases, respectively. Total projected case capture across the long-range study horizon totals 748 cases for Option A, 1,095 cases in Option B, and 1,452 cases in Option C.

Estimating Inpatient Beds (4.0 Psychiatric, 3.7 COE & 3.5 COE)



These case capture scenarios are then used to calculate KPUs using the Catawba Hospital/DBHDS suggested length of stay of 27 days and an 85% occupancy rate. The following graphic shows that hospital inpatients (ASAM Level 4.0) results in 65 to 126 KPUs.

The inpatient calculation is the only bed type where KPUs are calculated in a layered fashion because there are more variables that can be integrated into a demand model. The variable of inpatient length of stay has been the focus of much discussion. The team began with the average length of stay metric, typical in general acute care, then instead decided to focus on

median length of stay because this patient population has tremendous variability in their needs particularly if there are co-occurring conditions. Additionally, the length of stay metrics (average and median) provided by Catawba Hospital were aggregated across multiple data years, not allowing the HDR team to discern the most recent 12 month- data point. Ultimately, Catawba Hospital leadership suggested 27 days as a length of stay metric and that was used in the model.

SUD Hospital Inpatient (4.0 Psychiatric, 3.7 COE & 3.5 COE)

KPU Scenarios

	OPTION A	OPTION B	OPTION C
Case Capture Total	748 Cases	1,095 Cases	1,452 Cases
Length of Stay: 27.0	20,196 Days	29,565 Days	39,204 Days
Average Daily Census	55	81	107
Occupancy Rate	85%	85%	85%
KPU (Beds)	65	95	126

Source: HDR Advisory Services; Length of Stay provided by DBHDS

The remaining KPU calculations follow a different approach than the layered inpatient model because fewer metrics were available for study. The methodology for the remaining sections: residential/rehabilitation treatment and detoxification rely on the application of a crude use rate developed from a 2021 Treatment Episode Data Set (TEDS) specific to the type of treatment that would be provided by the SUD facility. The crude use rate was then applied to the 2022 population estimate for the defined market and the projected 2031 market. From there, a variety of case capture scenarios were developed to establish various estimates of the case capture opportunity. The volumes resulting from the tiered capture scenarios were then applied to median length of stay metrics produced from the same source. With an estimated number of cases for the SUD facility and a length of stay, a KPU estimate can be developed. These estimates are calculated at three levels to support three options. These same scenarios (options) could also be used to support the idea of the preliminary stages of the program to one in its maturity. The following sections outline the remaining KPU calculations.

Rehabilitation/Residential Treatment

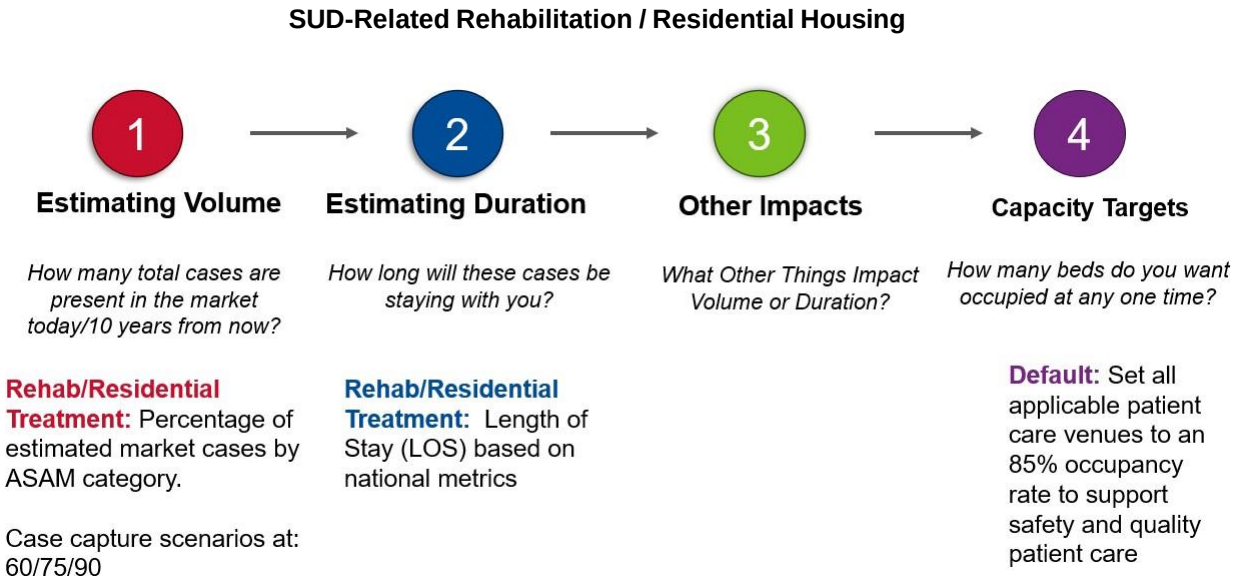
This category of patient treatment contains two categories: Short-Term (30 or less days and ASAM Level 3.5 COC) and Long-Term (30 days or more and ASAM Level 3.1). The graphic below provides a definition of the two treatment categories along with their respective median length of stay as cited in the 2021 TEDS report.

Addressing Patient Needs - Rehabilitation / Residential Housing

	Rehab/Residential Treatment	
	Rehabilitation/ residential, short-term (30 days or fewer)	**Rehabilitation/ residential, long-term (30+ days)**
	Typically, 30 days or less of non- acute care in a setting with treatment services for alcohol and other drug use and dependency	Typically, more than 30 days of non-acute care in a setting with treatment services for alcohol and other drug use and dependency; this may include transitional living arrangements such as halfway houses
ASAM Category	Level 3.5 COC	Level 3.1
Median LOS	19 Days	35 Days

Source: Treatment Episode Data Set (TEDS) 2021 Length of Stay (Days), HDR Team Analysis, ASAM Category Assignment Based on Most Recent Standards

The following graphic highlights the approach used in the inpatient KPU model but shifts the focus to Residential Treatment. The 2021 TEDS data provided a national number of cases for each treatment category. This metric, along with 2021 census data was used to develop a crude population use rate for the age 18+ population. This crude rate was, in turn, applied to the market population aged 18+ to develop an estimate of the market size. Three capture scenarios defined as 60%, 75%, and 90% served as estimates of what the SUD facility could have as an annual patient volume.



Short-Term Residential 3.5 (COC)

The following graphic outlines the number of cases estimated for the market followed by the three tests. These models reflect both the 2022 market estimate and the projected 2031 estimate and their whole-market difference of 77 cases. The 2022 estimate plus the whole market difference is what is used for calculating KPUs for each option. Short-Term Residential is listed on the left-hand side of the graphic and Long-Term Residential on the right.

The case capture scenarios across the three thresholds of 60%, 75% and 90% for both the 2022 population estimate and the corresponding 2031 projection. Based on the 2022 population for Short-Term Residential, the estimated number of cases in the market totals 1,160 cases. The capture scenarios indicate anywhere from a low 696 cases to a high of 1,044 cases that can be directed to the SUD facility. The 2031 projected Short-Term Residential totals indicate a base of 1,237 cases. Capture scenarios for this projection ranges from a low of 773 cases to a high of 1,121 cases. With the market size established and three case capture scenarios of 60, 75, and 90% defined and tested, options A, B, and C can then be developed. Using a median length of stay noted in the TEDS data, patient days and average daily census (ADC) can be calculated. No other impacts were considered in this model. Inpatient occupancy rates are set at 85%.

Estimating Rehabilitation / Residential Housing Beds

Leveraging National Data for the Targeted Market

1 **Estimating Volume**

Short Term (Level 3.5) COC		Long Term (Level 3.1)	
Base Market Growth	**Population-Based Growth**	**Base Market Growth**	**Population-Based Growth**
1,160 Cases (2022 Est Cases)	1,237 Cases (2031 Est Cases)	920 Cases (2022 Est Cases)	981 Cases (2031 Est Cases)
OPTION A 60% Capture 696 Cases	**OPTION A:** 696 Cases + 77 = 773 cases	**OPTION A:** 60% Capture 552 Cases	**OPTION A:** 552 Cases + 61 = 613 cases
OPTION B: 75% Capture 870 Cases	**OPTION B:** 870 Cases + 77 = 947 cases	**OPTION B:** 75% Capture 690 Cases	**OPTION B:** 690 Cases + 61 = 751 cases
OPTION C: 90% Capture 1,044 Cases	**OPTION C:** 1,044 Cases + 77 = 1,121 cases	**OPTION C:** 90% Capture 828 Cases	**OPTION C:** 828 Cases + 61 = 889 cases

Short Term - Rehabilitation / Residential Housing (3.5 COC)

KPU Scenarios

2 **Estimating Duration** → 3 **Other Impacts** → 4 **Capacity Targets**

	OPTION A	OPTION B	OPTION C
Case Capture Total	773 Cases	870 Cases	1,044 Cases
Length of Stay : 19	14,687 Days	16,530 Days	19,836 Days
Average Daily Census	40	45	54
Occupancy Rate	85%	85%	85%
KPU (Beds)	47	52	64

Source: HDR Advisory Services

According to the 2021 TEDS report, the median length of stay for Short-Term Residential is 19 days. This category of patient treatment is congruent with ASAM's Level 3.5. The KPU estimate which considers the three case capture scenarios reflects a low of 47 beds, a mid-range estimate of 52 beds, and a high of 64.

Long Term - Rehabilitation / Residential Housing (3.1)

KPU Scenarios

	OPTION A	OPTION B	OPTION C
Case Capture Total	552 Cases	690 Cases	828 Cases
Length of Stay : 35	19,320 Days	24,150 Days	28,980 Days
Average Daily Census	53	66	79
Occupancy Rate	85%	85%	85%
KPU (Beds)	62	78	93

Source: HDR Advisory Services

Long-Term Residential

Long-Term Residential beds are placed at an ASAM Level 3.1 and have a median length of stay of 35 days. From there, KPUs that support an 85% occupancy rate reflect a low of 62 beds, a mid-range count of 78, and a high estimate of 93 beds.

The KPUs for both Short-Term and Long-Term Residential Treatment at the three case capture models is as follows:

Short Term (3.5 COC), Long Term (3.1) Rehabilitation / Residential Housing

KPU Scenarios – Totals

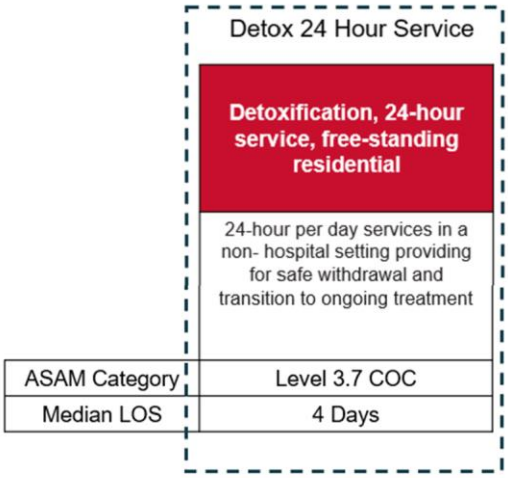
	OPTION A	OPTION B	OPTION C
KPU – Short (Beds) 3.5 COC	47	52	64
KPU – Long (Beds) 3.1	62	78	93
KPU – Total (Beds)	109	130	157

Source: HDR Advisory Services

Detoxification Treatment

The kind of detoxification treatment expected to be provided at the SUD facility is defined as a 24-hour service in a free-standing residential setting where the patient is expected to transition to ongoing treatment in another setting. This treatment category reflects ASAM Level 3.7 and has a median length of stay of four days.

Addressing Patient Needs within Detox Treatment

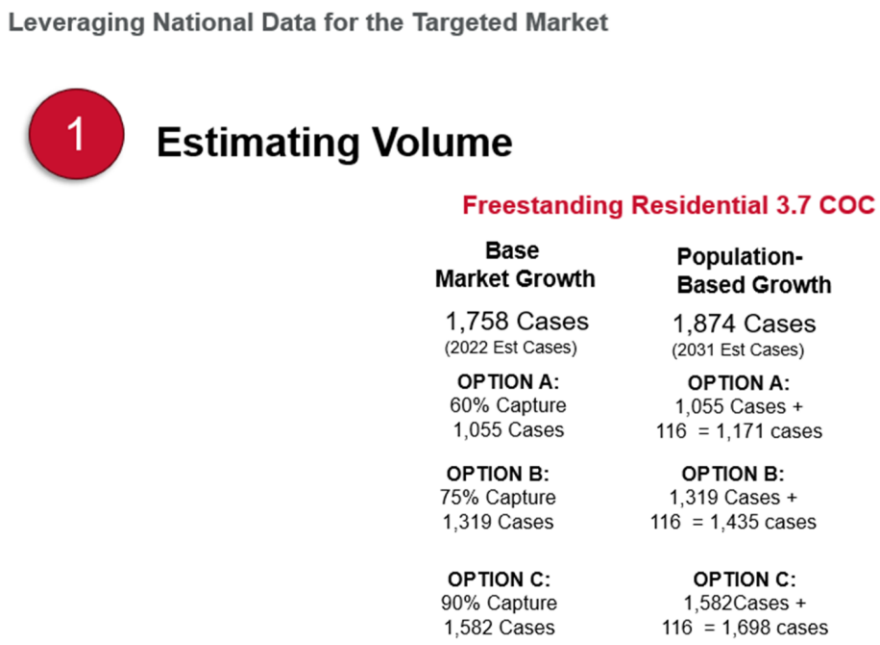


Source: Treatment Episode Data Set (TEDS) 2021 Length of Stay (Days), HDR Team Analysis, ASAM Category Assignment Based on Most Recent Standards

To recap, the approach for estimating the market size for this type of Detoxification treatment is the same as with Residential/Rehabilitation in which a crude use rate, developed by HDR analysts from national data published in the 2021 TEDS survey, is then applied to 2022 and 2031 population estimates for the defined service area. All population metrics are for the 18+ population. Market size estimates were subjected to capture scenarios at the same three thresholds of 60%, 75%, and 90%.

The 2022 based market is estimated to be 1,758 cases. Under the three scenarios, the SUD facility's potential market opportunity is a low 1,055 cases, mid-range at 1,319, and a high of 1,582 cases. The 2031 estimate suggests the market for this type of treatment will grow to 1,874 cases. The case difference between 2031 and 2022 is 116 cases. This places the SUD facility's long-range opportunity to be a low of 1,171 cases, mid-range 1,435, and a high of 1,698 cases.

Estimating Detoxification Beds



Detoxification Treatment-Freestanding Residential (3.7 COC)

KPU Scenarios

	OPTION A: 60% Case Capture	OPTION B: 75% Case Capture	OPTION C: 90% Case Capture
Case Capture Total	1,171 Cases	1,435 Cases	1,698 Cases
Length of Stay: 4	4,684 Days	5,740 Days	6,792 Days
Average Daily Census	13	16	19
Occupancy Rate	85%	85%	85%
KPU (Beds)	15	19	22

Source: HDR Advisory Services

With a median length of stay of four days, the KPU estimate across the three case capture scenarios begin at a low of 15 beds to a high of 22 beds. The graphic above details the metrics used to develop the KPUs.

KPU Summary by Bed Type (Modeled versus Provided)

The following graphic summarizes the KPUs developed for Inpatient 4.0/3.5, Short-Term Residential 3.5 COC, Long-Term Residential 3.1, and Detoxification 3.7 COC. The table reflects the number of KPUs generated from the data analysis against the number provided in the architectural design across the options A, B, and C.

KPU Bed Summary, SUD

	OPTION A	OPTION B	OPTION C
Modeled: SUD Inpatient (4.0 Psychiatric / 3.7 COE / 3.5 COE)	65	95	126
Provided: SUD Inpatient (4.0 Psychiatric / 3.7 COE / 3.5 COE)	**64**	**104**	**128**
Modeled: SUD Residential Short Term Residential (Level 3.5 COC)	47	52	64
Modeled: SUD Residential Long Term Residential (Level 3.1)	62	78	93
Modeled: Total SUD Residential	109	130	157
Provided: Total SUD Residential	**96**	**128**	**160**
Modeled: SUD Detoxification (Level 3.7 COC)	15	19	22
Provided: SUD Detoxification (Level 3.7 COC)	**16**	**32**	**32**

Source: HDR Advisory Services

Ambulatory Treatment Services

This category of treatment services is ambulatory based therefore no bed based KPUs are calculated. Instead, the number of visits across three distinct categories of treatment services are estimated. Even without KPU estimates, this information is relevant because it could inform the scale of outpatient services located at outpatient pavilions and it completes a view of the SUD service continuum. The Ambulatory categories, and their ASAM Level, include Outpatient Therapy 1.5; Intensive outpatient (including both High-Intensity Outpatient 2.5 and Outpatient 2.1) and medically managed outpatients (ambulatory detox which includes ASAM levels 1.7 and 2.7). The length of stay for each of these categories represents the median number of visits a patient may participate in treatment. The table below outlines the number of visits per patient by treatment category.

Treatment Service Continuum—Ambulatory Visits (2.7, 2.5, 2.1, 1.7 & 1.5)

	Ambulatory, non-intensive outpatient	Ambulatory, intensive outpatient (HIOP/IOP)	Ambulatory, detoxification
	Ambulatory treatment services including individual, family, and/or group services, and may include pharmacological therapies	As a minimum, the client must receive treatment lasting two or more hours per day for three or more days per week	Outpatient treatment services providing for safe withdrawal in an ambulatory setting (pharmacological or non-pharmacological)
ASAM Category	1.5	2.5 / 2.1	1.7 / 2.7
Median LOS (Treatment Series)	50 Visits	41 Visits	3 Visits

Source: Treatment Episode Data Set (TEDS) 2021 Length of Stay (Days), HDR Team Analysis, ASAM Category Assignment Based on Most Recent Standards

Ambulatory Visits (2.7, 2.5, 2.1, 1.7 & 1.5) – 2022 Projection

	Outpatient 1.5	Intensive Outpatient (HIOP/IOP) 2.5 / 2.1	Ambulatory Detox 1.7 / 2.7
2022 Market Estimate	5,317 Cases	1,381 Cases	85 Cases
Length of Stay : 50 OP; 41 HIOP/IOP; 3 Amb Detox	265,850 Visits	56,621 Visits	255 Visits
60% Capture Rate	159,510 Visits	33,973 Visits	153 Visits
75% Capture Rate	199,388 Visits	42,466 Visits	191 Visits
90% Capture Rate	239,265 Visits	50,959 Visits	230 Visits

Source: HDR Advisory Services

Because no KPUs are being calculated for this patient category, the visit estimates are presented first as they apply to the 2022 residential population then subjected to the three capture scenarios which remain at 60, 75, and 90%. For this data year, the market size for Outpatient Level 1.5 was placed at 5,317 cases and has 50 visits per patient associated with it. Intensive Outpatient Level 2.1/2.5 has an estimated 1,381 cases with 41 visits per patient and Ambulatory Detox Level 1.7/2.7 is 85 cases with three visits per patient. The table below ("Ambulatory Visits 2013 Projection") shows Outpatient 1.5 could represent a high of 239,265 visits to a low of 159,510 visits. Intensive Outpatient Level 2.1/2.7 has a high visit estimate of 50,959 visits to a low of 33,973 visits. Finally, Ambulatory Detox Level 1.7/2.7 represents the opportunity to capture a high of 230 visits to a low of 153 visits.

The long-range visit capture opportunity across ambulatory services follows the same methodology except that it is only for the 2031 residential population. For Outpatient Level 1.5, the market size during this data year is placed at 5,669 cases. With 50 visits per patient, this translates to a capture opportunity with a low of 170,070 visits and a high of 255,105 visits. Intensive Outpatient is estimated to have 1,472 cases in 2031. With 41 visits per patient, a high of 54,317 visits at a 90% capture rate to a low of 36,211 visits at a 60% capture rate is estimated. Ambulatory Detox Level1.7/2.7 is forecasted to have 91 cases altogether and three visits per person is translated to a high capture rate of 259 visits and a low of 164 visits.

It is worth noting that the Community Services Boards also support this type of treatment. Because of that dynamic, an additional calculation that tested the division of cases between the SUD facility and the CSBs was performed. All of the tests were applied to the 2031 estimates since the feasibility study is evaluating how SUD patient needs can be addressed today and int the future.

Ambulatory Visits (2.7, 2.5, 2.1, 1.7 & 1.5) – 2031 Projection

	Outpatient 1.5	Intensive Outpatient (HIOP/IOP) 2.5 / 2.1	Ambulatory Detox 1.7/2.7
2031 Market Estimate	5,669 Cases	1,472 Cases	91 Cases
Length of Stay : 50 OP; 41 HIOP/IOP; 3 Amb Detox	283,450 Visits	60,352 Visits	273 Visits
60% Capture Rate	170,070 Visits	36,211 Visits	164 Visits
75% Capture Rate	212,588 Visits	45,264 Visits	205 Visits
90% Capture Rate	255,105 Visits	54,317 Visits	259 Visits

Source: HDR Advisory Services

Ambulatory Visits (2.7, 2.5, 2.1, 1.7 & 1.5)

Division Between SUD Outpatient and CSBs

Based on Capture Rate Scenarios and 2031 Projection, Scenario 1

	Outpatient 1.5	Intensive Outpatient (HIOP/IOP) 2.5 / 2.1	Ambulatory Detox 1.7/2.7
60% Visit Capture Rate	170,070 Visits	36,211 Visits	164 Visits
New SUD / CSB Split: 20% / 80%	SUD 34,014 / CSB 136,056	SUD 7,242 / CSB 28,969	SUD 33 / CSB 131
75% Visit Capture Rate	212,588 Visits	45,264 Visits	205 Visits
New SUD / CSB Split: 20% / 80%	SUD 42,518 / CSB 170,070	SUD 9,053/CSB 36,211	SUD 41/ CSB 164
90% Visit Capture Rate	255,105 Visits	54,317 Visits	259 Visits
New SUD / CSB Split: 20% / 80%	SUD 51,021/ CSB 204,084	SUD 10,863 / CSB 43,454	SUD 52 / CSB 207

Source: HDR Advisory Services

The first split scenario attributes 20% of the visits captured to the SUD facility and the larger 80% spread across the various CSBs. The table above outlines the 20/80 split across each visit capture scenario against each type of Ambulatory treatment category.

Another split scenario is tested where the SUD facility maintains 40% of the visit capture scenario and the CSBs have 60%. Like before, the table below outlines the 40/60 split across each visit capture scenario for each treatment category.

Ambulatory Visits (2.7, 2.5, 2.1, 1.7 & 1.5)

Division Between SUD Outpatient and CSBs

Based on Capture Rate Scenarios and 2031 Projection, Scenario 2

	Outpatient 1.5	Intensive Outpatient (HIOP/IOP) 2.5 / 2.1	Ambulatory Detox 1.7/2.7
60% Visit Capture Rate	170,070 Visits	36,211 Visits	164 Visits
New SUD / CSB Split: 40% / 60%	SUD 68,028 / 102,042 CSB	SUD 14,484 / 21,727 CSB	SUD 66 / 98 CSB
75% Visit Capture Rate	212,588 Visits	45,264 Visits	205 Visits
New SUD / CSB Split: 40% / 60%	SUD 85,035 / 127,553 CSB	SUD 18,106/27,158 CSB	SUD 82 / 123 CSB
90% Visit Capture Rate	255,105 Visits	54,317 Visits	259 Visits
New SUD / CSB Split: 40% / 60%	SUD 102,042 / 153,063 CSB	SUD 21,727 / 32,590 CSB	SUD 104 / 155 CSB

Source: HDR Advisory Services

The market opportunity for the SUD facility to provide specialized SUD services across a continuum is strong. The market opportunity leverages hospital-provided and national data sources to estimate the size of the market and test various capture scenarios. These scenarios reflect high, mid, and low-range thresholds which could also represent the ”ramp-up” of services at the SUD facility. This would mean that upon opening a new service site, volume might resemble the low capture scenario while, as time passes, volumes grow to elevated levels. A key component of the program(s) success depends on the SUD facility’s ability to staff the service accordingly and team with the right partners.

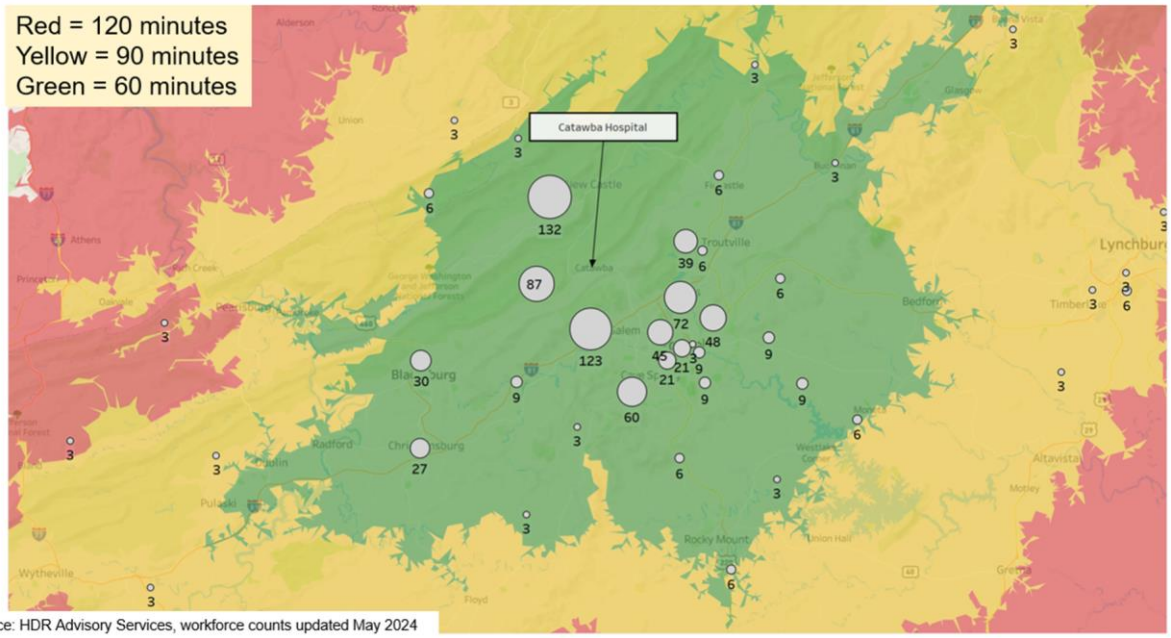
Workforce Development

Catawba Hospital, according to the hospital's Director, has sufficient staff to perform its current mission. However, in any of the option models discussed, additional staff, with potentially different expertise, will be needed. The lingering effects of the pandemic and rising wages have resulted in a tight labor market across the country; Virginia is no different and is not immune to the effects of it.

The new SUD facility will need to look attractive to recruit the necessary staff that will support the enhanced mission. There are only a few treatment facilities that offer the full continuum of care in the nation and the SUD facility will need to offer it as well as other services not offered anywhere else. A new SUD facility would join an elite group of facilities that would be enticing to many professionals. In addition, there is a possibility of partnering with educational institutions that will provide training and research opportunities for the current and additional staff.

To improve access to SUD care, there must be an implementation of strategic efforts to attract and retain a high-quality, diverse, and culturally responsive workforce and identify new ways to accelerate training and entry into behavioral health careers. The new education program elements in the proposed outpatient research building help achieve this goal. It is recommended that the space programmed to be an educational setting in the building is explored with the current university partners that would have students working on the campus. This would ensure that the new construction meets the needs and requirements for state-of-the-art training facilities needed by those institutions.

Employee Location by Drive Time from Catawba Hospital

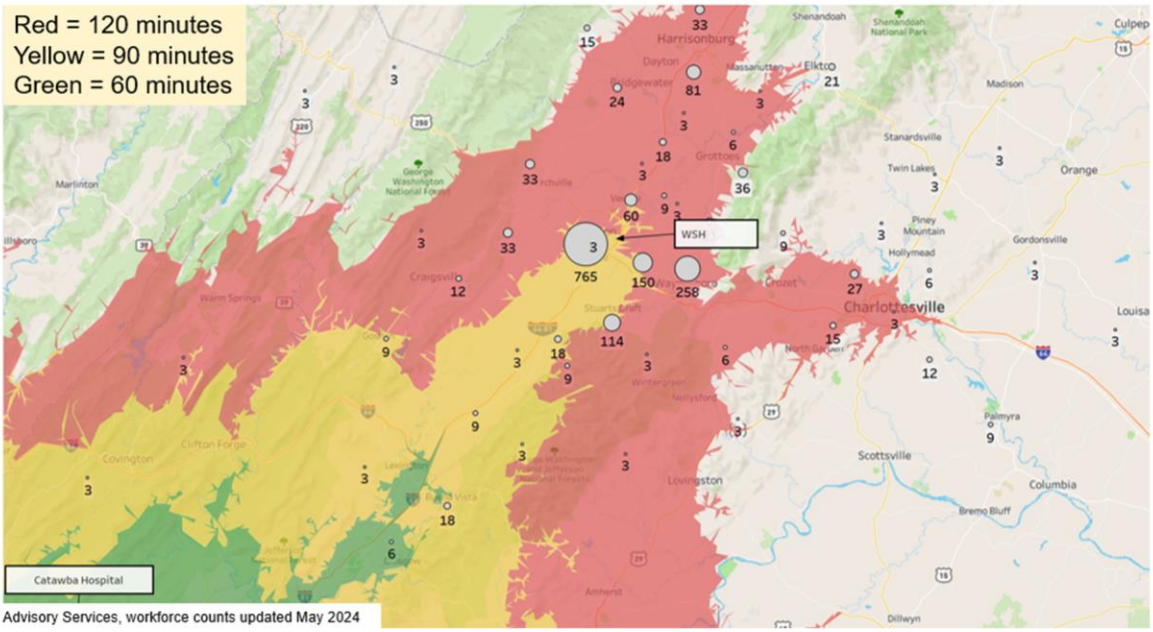


Source: HDR Advisory Services, workforce counts updated May 2024

The diagram above shows the time it takes the Catawba workforce to drive from nearby residential areas to come to the campus. The team used a special program that analyses drive time from point to point. This shows actual times to travel to the campus from every zip code of every employee at Catawba Hospital. The number below the

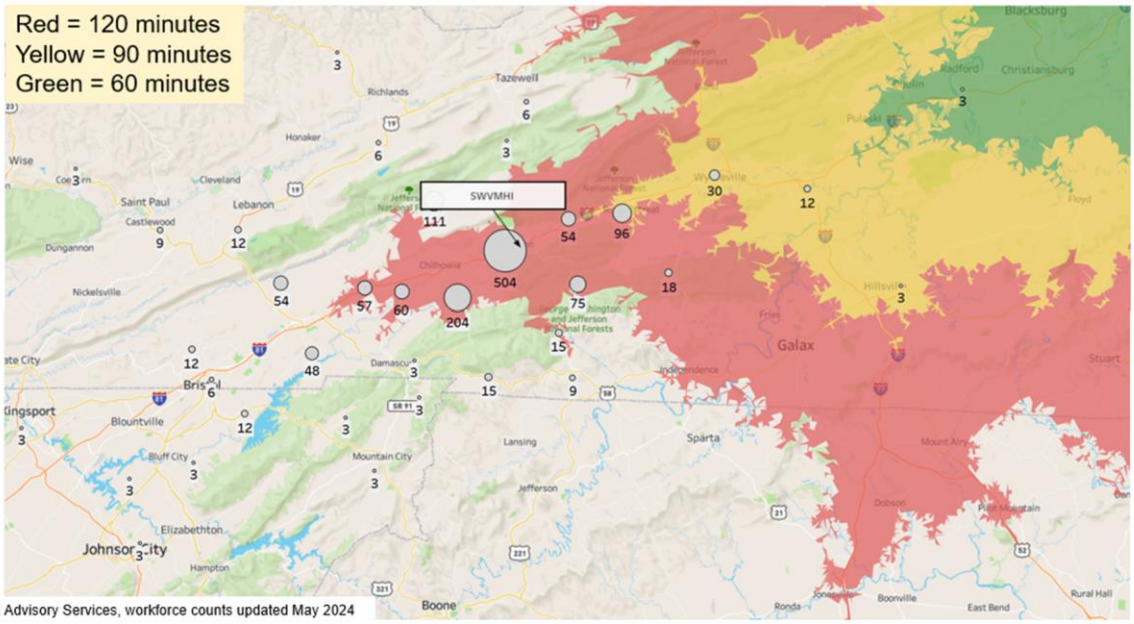
various circles represents the number of employees in that zip code. The colors show drive times in 60-minute increments. This can help focus recruiting and marketing of new staff and future staff and provide recommended housing areas for new hires moving to the area. The following maps show the drive time from each of the other DBHDS hospitals in the regional capture area for the new SUD Treatment Facility. The last map shows all hospitals and Drive times combined over the market area.

Employee Location by Drive Time from Catawba Hospital
Western State Hospital



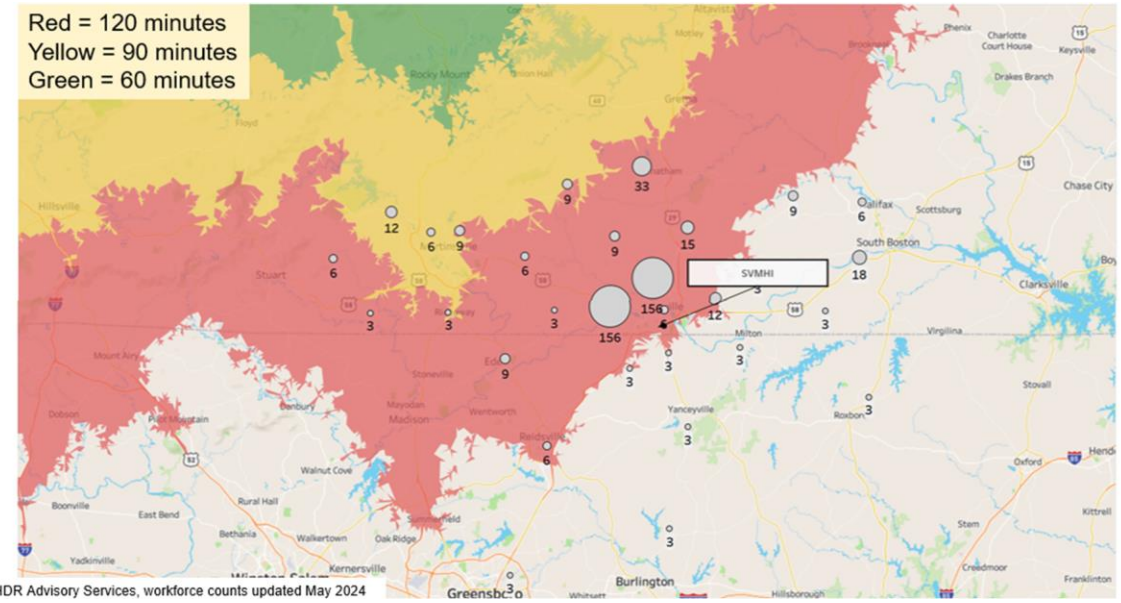
Source: HDR Advisory Services, workforce counts updated May 2024

Employee Location by Drive Time from Catawba Hospital
Southwestern Virginia Mental Health Institute



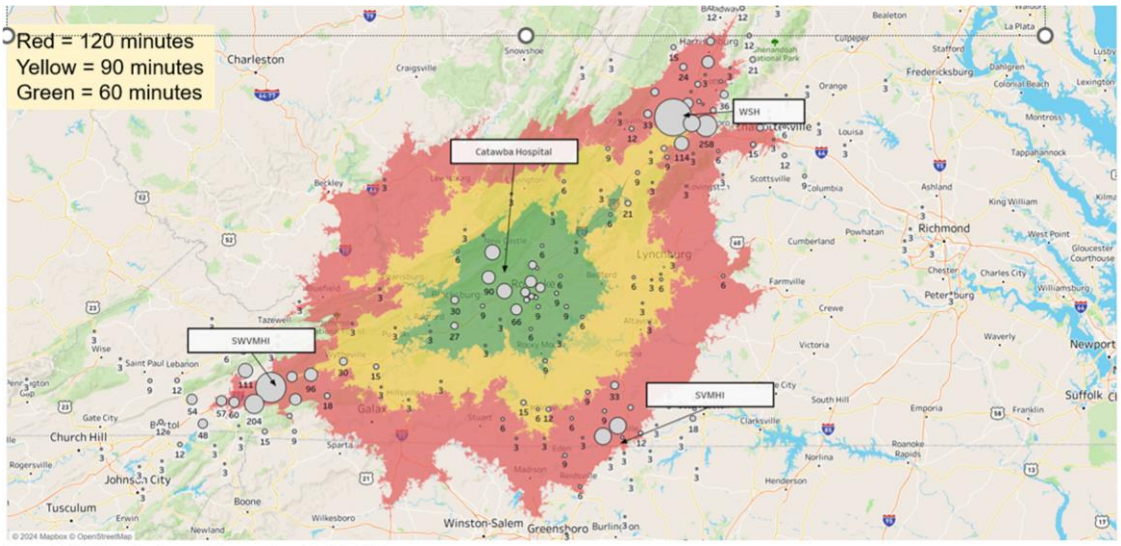
Source: HDR Advisory Services, workforce counts updated May 2024

Employee Location by Drive Time from Catawba Hospital
Southern Virginia Mental Health Institute



Source: HDR Advisory Services, workforce counts updated May 2024

Workforce Location and Drivetime Relationship from Catawba Hospital



Source: HDR Advisory Services, workforce counts updated May 2024

The Catawba Hospital campus is located in the middle of a rich source of healthcare professionals. There is a surplus of Registered Nurses available in the Roanoke Valley. Over 30,000 people in the Valley work in healthcare. The new SUD facility will be able to draw upon this pool without drawing staff from the other hospitals in the area. Much of this “surplus” is due to the educational institutions in the area that help produce this wealth of staff. The various private hospital systems in the area like Carillion, HCA, ECPI and many others, makes the Valley attractive professionally. The scenic mountain location contributes to a quality of life that is equally attractive. The new SUD facility will likely require 300 – 350 new employees when fully operational and will have no problem attracting and retaining quality staff if the experience of Catawba Hospital is the example.

Transportation

According to the American Hospital Association and their *Social Determinants of Health Series: Transportation and the Role of Hospitals*, 3.6 million people in the United States do not obtain medical care each year due to transportation issues. Access to reliable and adequate transportation is a critical component for any healthcare facility as a lack of access leads to missed or delayed appointments, poorer health outcomes, and ultimately, increased health expenditures for an organization. Lack of access increases the potential for social isolation as well and is a critical issue within the area given the patient population served by Catawba Hospital. Public transportation can also have an impact on staffing and the resources available to an organization. This is particularly true for support service employees providing functions like environmental services, food services, and security.

Public transportation is especially important to the SUD facility and its future as a center of

The Smart Way Route Map with the location for the proposed extension to Catawba

excellence for a continuum of care towards substance use disorder treatment given its somewhat remote location in the Roanoke Valley Metro Area and potential access concerns during inclement weather. Currently, Valley Metro, the local public transportation provider, does not service Catawba. As a part of the master planning effort, the team met with the operations leadership team at Valley Metro to explore potential transportation options and estimated costs for implementing those options that could potentially be subsidized by the Commonwealth to support Catawba Hospital campus. There is an existing route between Roanoke and Blacksburg (the Smart Way Bus Route), that could be easily modified to add a stop at the Catawba Hospital campus– see map above.

As a next step, a study would need to be completed by a qualified transportation engineering firm to determine the logistics (number of stops per day, times, etc.) for the route that would serve and support the Catawba Hospital campus, both in the current day state and future state. This solution could be implemented with a yearly operating budget under $500,000 based upon the cost metrics provided by Valley Metro (~ $52/hour to add a stop to an existing route).

Substance Use Disorder and Behavioral Health & Public-Private Care Models

The demand for substance use disorder (SUD) services has progressively increased to the point that it has been characterized as a crisis by many industry experts. When the behavioral needs of a community exceed capacity (or capability), the opportunity to forge partnerships to gain efficiencies, reduce costs, and scale services becomes a priority for both care providers and the purchasers of care. Although many of the public-private partnership (PPP) examples are geared primarily toward mental health, the models are equally applicable to SUD treatment facilities. In most cases, SUD patients have co-occurring mental health issues which must be treated along with the SUD.

Public Behavioral Health Facilities being Operated by Private Companies

Partnership models designed to address a defined scope of health care needs can involve a variety of players. A partnership facilitates the shared reward and risk of services strengthened or expanded to support a shared goal. Healthcare delivery partnerships are forged between healthcare providers; providers and payors; providers and employers; a provider and a public agency commonly called public and private partnerships; and many other model variations can be a form of arrangement in which private companies are contracted to operate public behavioral health facilities. PPPs involve a collaboration between the public sector and private companies to deliver a public service or project. In the context of behavioral health care, a PPP might involve a private company partnering with a public healthcare system to operate a public behavioral health hospital or clinic.

Under a PPP arrangement, the private company may be responsible for managing the day-to-day operations of the facility, including hiring and supervising staff, managing budgets, and providing clinical services to patients. The public sector may provide funding for the facility and set performance standards and quality benchmarks for the private company to meet. The private company may also be required to meet certain financial and performance targets, such as reducing costs or improving the quality of care. PPPs can be beneficial in that they can bring private sector expertise and efficiency to the delivery of public services.

Public healthcare systems have been contracting with private companies to operate public behavioral health facilities in various countries around the world for some time. These facilities provide specialized care for individuals with mental health and substance use disorders and may offer a range of therapeutic services such as individual and group therapy, medication management, and support for recovery and rehabilitation.

For example, in the UK, the NHS Any Qualified Provider program allows private companies to bid for contracts to deliver NHS-funded healthcare services. Under this program, private companies can operate public mental health hospitals and clinics, while the NHS provides the facilities and equipment. One case of a private company operating an NHS mental health facility is the Cygnet Health Care group, which has a contract to operate several mental health hospitals and clinics in the UK.

In Canada, some provinces also contract with private companies to operate public mental health facilities. For example, the province of Ontario contracts with private companies to provide mental health services in certain regions. The Canadian Mental Health Association is one such organization that operates several public mental health clinics and hospitals in Ontario under contract with the province.

In the United States, many states have contracts with private companies to operate public mental health clinics and hospitals. Some examples of private companies that operate public behavioral health hospitals in the United States include Aurora Behavioral Health Services, Universal Health Services, HCA Healthcare, and Acadia Healthcare.

Overall, this arrangement allows the public healthcare system to provide the building and infrastructure for these facilities, while a private company is responsible for the day-to-day operations and ensuring that the quality of care meets the needs of patients. The public system may also set performance standards and monitor the care provided by the private company to ensure that it meets the necessary standards.

Benefits and Drawbacks:

Public-private partnerships can offer several potential benefits to the SUD facility, including:

Increased funding: Private sector partners can bring additional financial resources to an SUD treatment facility, which can be used to improve and expand services, purchase new equipment, or invest in research and development.

Improved efficiency: Private sector partners may have expertise in managing and operating hospitals more efficiently, which can lead to cost savings and an improved quality of care.

Innovation: PPPs can provide opportunities for the introduction of new technologies, approaches, and practices that may not have been possible without private sector participation.

Access to new markets: PPPs can help SUD treatment facilities expand their services to new geographic areas or populations that may not have been served otherwise.

Risk sharing: PPPs can help SUD treatment hospitals manage and share the financial and operational risks associated with running a hospital, which can help stabilize and secure the hospital's long-term future.

It is important to note that PPPs can also have potential drawbacks and challenges, including the need to carefully manage the balance of public and private interests, and to ensure that private sector partners are held accountable for their performance. It is also important to consider the potential impact on patients, staff, and other stakeholders, and to ensure that any PPP is structured in a way that prioritizes the needs and interests of these groups.

Below are three profiles of partnership models supporting behavioral health services and how they approached the behavioral health needs of a defined population. Again, the examples provided are primarily behavioral health, but the PPP model can potentially be adapted to an SUD centric PPP.

Roanoke Valley represents the largest metropolitan statistical area in western Virginia with a population of 325,000. The area of the SUD facility catchment area as defined in the data section of this report represents 1.8 million in population. The examples below are generally of similar sized metropolitan statistical areas. Links are provided to other resources applicable to the example.

EXAMPLE 1:

Wake Med Behavioral Health Network (Wake County, NC)

In 2017, WakeMed Health and Hospitals established an integrated collaboration with numerous public and private agencies called the WakeMed Behavioral Health Network (WMBHN) within Wake County, NC. The Wake County population was over 1.1 million in 2021 making it the largest county in the state of North Carolina. The intent behind this initiative was to improve access and care coordination for patients suffering from mental and chronic health conditions. The Network was designed with the goal of improving disease detection, accelerating access to services, improving patient engagement, and impact avoidable costs by reducing emergency department visits and reducing inpatient readmissions. The WMBHN has evolved over the years and has subsequently expanded its partnerships. Partners are grouped by their service focus across five categories with the umbrella program being WakeMed Behavioral Health. While this model **does not specifically include a public agency**, it does illustrate how the pooling of resources facilitates the right care at the right place for patients, thus serving a broader public benefit while fulfilling private sector goals. Performance metrics focused on reduced emergency room visits, admissions, and length of stay. Due to North Carolina laws, financial incentives between partners were limited or prohibited.

Partner categories include:

Connected Community

This subset brings together social service agencies and positions them to receive referrals from network providers to manage inflow and resources. They participate in and are the beneficiary of network-wide fundraising, grant applications/administration, and other funding activities. Similarly, health impact data in the form of referral volumes, health outcomes, and direct/indirect service impact are shared across the network. The organizations represented in Connected Community also participate in NCCARE360, a statewide network uniting healthcare and human service organizations with a shared technology that enables a coordinated, community-oriented, person-centered approach for delivering care. Prominent members include: Healing Transitions, a Place for Recovery; NC MedAssist, Dispensing Hope for the Uninsured; Neuro Community Care; The Center for

Volunteer Giving; The Green Chair Project; and StepUp Ministry, Jobs|Life Skills|Stability. Other organizations focusing on food banks and food access are also in this group.

Triangle Behavioral Health Council (TBHC)

Members of this group offer inpatient behavioral health services and include hospital providers and recovery centers. The shared goal of this group is to provide accelerated access to high-performance inpatient, outpatient, and social service networks. A patient referred to one of these providers is educated on the treatment options for their illness and benefits from access to the services within the Connected Community group. Agencies share care coordination services with an emphasis on data.
Performance dashboards highlight avoidable bed days, involuntary commitments, readmissions, time to access, average length of stay, patient activation and engagement rates, care integration, and fiscal impact. Prominent members include Fellowship Hall, Drug and Alcohol Recovery Center; Holly Hill Hospital; Triangle Springs; and UNC Hospitals-Wakebrook. Other members include Brynn Marr, Maria Parham, and Old Vineyard Hospital.

Network for Advancing Behavioral Health (NABH)) .

Representing the outpatient side of behavioral health services, these organizations share some of the same benefits as the TBHC as well as pre-qualified referrals and, in some cases, direct admission to BH crisis and inpatient facilities. Member organizations benefit from data sharing and support patient care coordination. This group can also benefit from value-based contracting incentives related to outcomes, but the NABH does not serve as the contract negotiating capacity for members. Members include

Carolina Outreach; The Carter Clinic; Daymark Recovery Services; Easterseals|UCP; Fellowship Health Resources; Fernandez Community Center, LLC; Holly Hill Hospital; Hope

Services, LLC; Mindpath Health; Monarch; Morse Clinics; RHA Health Services, Sigma Health Services, LLC; SouthLight; Triangle Springs; WakeMed; Yelverton's Enrichment Services, and Eleanor Health.

WakeMed Services

This branch of WakeMed Behavioral Health reflects the WakeMed Health System and provides BH crisis & assessment; psychiatry; transitional care management; and community case management.

WakeMed Physician Practices

A large component of this branch are WakeMed's primary care practices that support disease screening; low-risk BH care; Project OBOT (office-based opioid treatment); and Co-lo/Reverse Co-locations. The co-location models either have BH embedded into a primary care practice (co-location) or a primary care capability within a BH practice (reverse co-location). Project OBOT is a program initiated by the North Carolina Medical Society helping to bridge the delivery of Medication Assisted Treatment (MAT) to treat opioid use disorders. A virtual platform for this service (Project VBOT) reflects the next generation of this program.

Take-Aways: Building an extensive partner network requires clear participation criteria, good communication, and a commitment to share data. The categorization of partners supports functional synergies and supports increased referral opportunities. While not addressed in publicly available profiles, capacity limitations with a partner could interrupt the patient's journey to wellness. How and when partners enter and exit the network should be clearly defined to maintain amicable relationships. The establishment of performance metrics on the front-end of any initiative enables the unbiased assessment of partner performance.

The WakeMed Behavioral Health Network model can be applied to the SUD facility in several ways. One key aspect of the WMBHN model is the grouping of partners into categories based on their service focus. This allows for a more coordinated and streamlined approach to care delivery, with each category working together to provide a full range of services to patients. This model could be replicated by grouping potential partners into categories based on the services they offer, which could help facilitate better care coordination and improve patient outcomes.

Another key aspect of the WMBHN model is the emphasis on data sharing and care coordination. This can help ensure that patients receive the right care at the right place and that care is delivered efficiently and effectively. By implementing similar strategies for data sharing and care coordination in new collaborations, it may be possible to improve patient outcomes and reduce avoidable costs. Effective data sharing among all entities (public and private) can streamline communication across all points of care and allow patients to move more seamlessly through the continuum of care. This can include information sharing on bed and provider

availability, referrals, health outcomes, disease screening, length of stay, patient activation and engagement rate, and more. Patients struggling with mental health and addiction often receive care across this continuum, so the success of their treatment depends on effective communication and coordination among all providers on the continuum, including primary care. Utilizing shared technology enables a coordinated, community-oriented, person-centered approach to delivering care and should be considered for this project.

It may also be helpful to consider how new collaborations can facilitate access to a wide range of services, as WMBHN does through its Connected Community category. This may involve working with social service agencies and other organizations that can provide support and resources to patients outside of the healthcare setting.

Finally, it may be helpful to consider how new collaborations can involve multiple stakeholders, including primary care practices, hospitals, and behavioral health providers. By establishing relationships with a wide range of partners, it may be possible to create a more comprehensive and integrated approach to care that meets the needs of patients more effectively.

EXAMPLE 2:

Michigan Mental Health Integration Partnership (MIP) (Ann Arbor, MI)

Since 2006, a collaboration between Ann Arbor-based University of Michigan (U-M) and the Michigan Department of Health and Human Services called the Michigan Mental Health Integration Partnership (MIP) has been addressing behavioral health access through community partnerships, project sponsorship, and the implementation of innovative, state-of-the-art care models. The MIP focuses their efforts on children and adults participating in the State's Medicaid program. Projects funded through the U-M Department of Psychiatry leveraged 1:1 matching funds from foundations and the Centers for Medicare and Medicaid Services so the MIP could underwrite evidence-based collaborative care interventions (EBIs). Since projects are initiated through the University of Michigan, faculty members representing psychiatry, internal medicine, family medicine, pediatrics, emergency medicine, social work, and public health can connect with public health experts and contribute their expertise to slate of initiative(s) planned for the coming year. U-M investigators follow a process or roadmap for transitioning the completed project to the stakeholder agency. By having the stakeholder partner part of the project team, the transition of ownership is intended to be fluid. However, due to a reported varied approach to project planning, complications have been known to arise.
Additional time with project planning is considered the remedy to this challenge, but a greater

one exists with the project's long-term sustainability due to uncertain funding guarantees. Still,

this partnership supports care innovations within the Medicaid population by initiating projects in settings like primary care clinics, federally qualified healthcare centers (FQHC), middle and high schools, hospitals, and community mental health.

Examples of funded investigative initiatives include:

1. Expansion of child/adolescent access to mental health services using telepsychiatry in Flint, MI
2. Integrating of mental health services in primary care for vulnerable populations
3. Implementation of school-based cognitive behavioral therapy (CBT) for students across Michigan
4. Development of a new support program to help fathers enhance family engagement and parenting skills in Wayne County, MI

Take-Aways: Internet-published materials describing the Mental Health Integration Project appear to be much stronger on the University of Michigan side opposed to the Michigan Department of Health & Human Services. The absence of DHHS internet references could simply reflect how Michigan government agencies choose to describe their activities. What is also unclear is how U-M researchers work with the DHHS to determine need so funded initiatives can provide incremental value to the physical and mental health needs of the Michigan Medicaid population. Because projects typically have a study period of one year, decisions about their continuation would have to be made then because grants or other funding sources must be established.

Beyond this project, partnerships with Academic Medical Centers (AMCs) can provide mutually beneficial service structures. For instance, AMCs need venues to train medical students on how to work in rural communities where patients have challenging circumstances. Oftentimes, an AMC will forge a relationship with a FQHC and rotate their providers through that setting to have that kind of training. In return, the FQHC gains access to medical providers they might not have been able to recruit on their own. Other benefits of an AMC partnership include improved access to specialty providers. Access to specialized, higher acuity services is a challenge for some patient populations for multiple reasons. Therefore, should an AMC partnership centered on activating research engagements, what type of projects and their short and long-term benefits should be clearly defined. An AMC partnership has many benefits, but the terms of engagement need to be clearly established to maintain the patient as the ultimate beneficiary of the arrangement. This partnership relies heavily on grant funding for its initiatives; no performance pay or other similar financial agreements appear to be in place. Ann Arbor, Michigan is located in Washtenaw County where the 2020 estimated population totaled 372, 258.

Catawba Hospital has a relationship with many regional providers and educators: Virginia Tech School of Medicine, Radford Universality, local Hospital Corporation of America (HCA), and the Carilion Clinic. Similar partnerships and relationships should be established by the new SUD facility. These partners can enhance their current staff and students on the campus. These staff psychiatrists hold faculty positions and help educate psychiatry residents and medical students on the campus. The hospital also offers clinical practicum opportunities for students in various fields, such as nursing, psychology, social work, music therapy, recreation therapy, and food and nutritional services. This partnership, along with connections to organizations such as Blue Ridge Behavioral Health Care, provides an opportunity to form a network for community partnerships, project sponsorships, and the implementation of innovative mental health and addiction care models. This network can secure funding from various sources, including academia and foundations, to develop evidence-based care interventions in schools, community mental health centers, and other hospitals. This can lead to more innovation and integration in the care continuum and potentially increase access to care for vulnerable populations, depending on the funded research initiatives.

Establishing a new collaboration similar to the Michigan Mental Health Integration Partnership (MIP) would require the consideration of several key factors. First, organizations would need to identify the specific goals and objectives of the collaboration. For example, the SUD facility may focus on improving access to SUD services for a particular population or implementing innovative care models to improve the quality of care.

It will also be important to consider how the SUD operator will engage with community partners and stakeholders, as the MIP did through its partnerships with primary care clinics, FQHCs, schools, hospitals, and community mental health centers. Building strong relationships with these partners can help ensure the success of the collaboration and help Catawba achieve their goals. Additionally, SUD providers may want to consider how they will involve faculty members and other experts from different disciplines, as MIP did with representatives from psychiatry, family medicine, emergency medicine, social work, and public health.

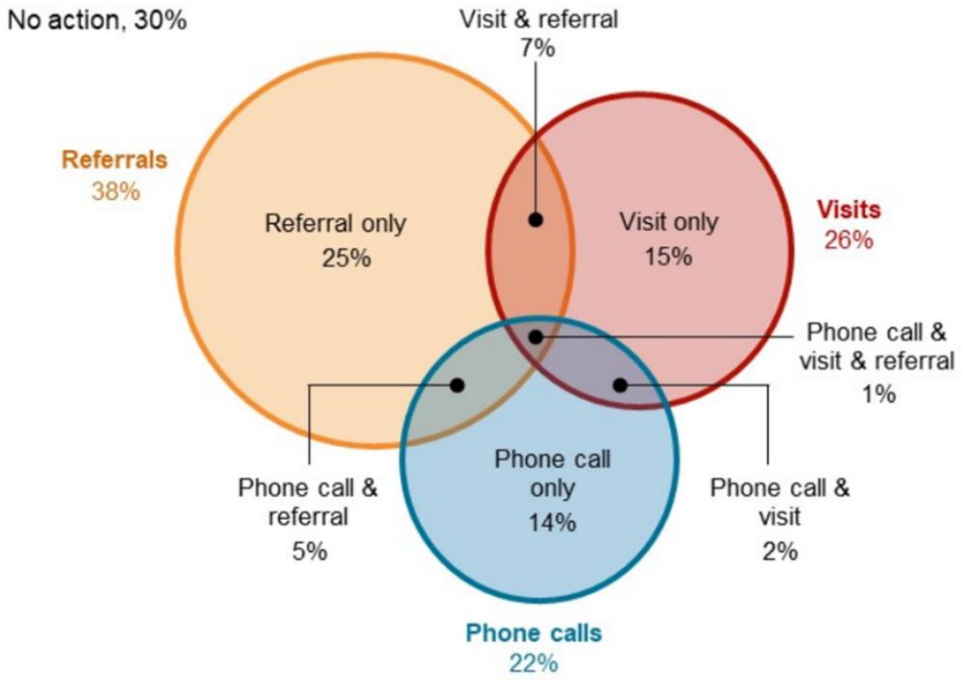
Finally, it will be important to consider how DBHDS will plan and implement these projects and initiatives, and how they will ensure their long-term sustainability. This may involve developing a roadmap or process for transitioning completed projects to stakeholder agencies and establishing clear terms of engagement for partnerships with academic medical centers (AMCs). It will also be important to consider how DBHDS will evaluate the impact and effectiveness of their projects and initiatives.

EXAMPLE 3: –

The East Metro Mental Health Roundtable (Minneapolis-Saint Paul, MN)

The East Metro Mental Health Roundtable is a collaboration of over 25 community organizations in the Twin Cities east metro region (Minneapolis-Saint Paul) that share a common goal of improving mental health care in the community. The Minneapolis-Saint Paul region has an estimated 3.16 million population with the City of Saint Paul having 307,193 residents. The roundtable focuses on initiatives that aim to improve care, educate the public, prevent mental health crises, and reduce the use of emergency rooms, hospitals, and legal resources for mental health issues. Through public-private partnerships, the roundtable has been successful in improving care and reducing costs for treating mental illnesses. One of the roundtable's first initiatives was to identify and track key mental health care metrics to identify gaps in the system and track the community's progress. This includes average wait time in hospital emergency departments; number and percentage of people in jail and correction facilities who need mental health follow-up; number and percentage of police/sheriff calls related to emotionally disturbed people; and several measures to determine wait times of hospital inpatient for referrals to community-based services. This data was used to identify areas where care was lacking or where there were inefficiencies in the system, and the roundtable worked to address these issues to improve care for those with mental illnesses. See graphic on the following page:

Follow-up activities by Saint Paul Police Department Community Outreach and Stabilization Unit after event response, Q1-Q2 2019



Source. Saint Paul Police Department, 2019.
Note. The Saint Paul Police Department tracks data by event, not by individual. The percentages are calculated out of the total number of events involving an adult.

In addition to tracking metrics and identifying areas for improvement, the roundtable also has several programs in place to address specific issues related to mental health care. For example, the Mental Health Drug Assistance Program (MHDAP) was implemented to provide timely access to psychiatric medications, which can be a major factor in preventing mental health crises that require hospital care. The MHDAP covers co-pays, deductibles, or the full cost of medications for up to three prescription fills in 90 days for adults living in the east metro area who receive care from designated clinics. This program has been successful in reducing the cost of prescriptions by 84% (filling prescriptions with medications on HealthPartners formulary) and has also led to decreases in psychiatric hospitalization, jail visits, homelessness, and thoughts of self-harm.

The roundtable has also made efforts to improve crisis management in the community. Many mental health crisis situations are urgent, but often do not require a visit to the emergency room. However, many people in these situations go to the hospital due to a lack of other options or a lack of awareness of those options. To address this issue, the East Metro Crisis Alliance has worked with the roundtable to design and implement several programs that provide alternatives to hospitalization for those facing a mental health crisis. These programs include the Mental Health Crisis Stabilization service, which provides short-term treatment and helps move individuals from crisis to ongoing care, and the Urgent Care for Adult Mental Health in St. Paul,

which provides walk-in access to crisis services and has prevented the use of emergency room resources for 227 patients each year.

The roundtable has also worked to improve emergency room readiness for mental health situations that do require hospitalization. In partnership with several local hospitals, the roundtable has increased the number of mental health beds in the east metro area by nearly 20% since 2007. Additionally, they have implemented programs such as the Medical Respite Unit at the Higher Ground shelter, which provides a place for individuals to recover after a mental health crisis before returning to their homes or other housing options, and the Mental Health Emergency Department Navigation program, which provides support and assistance to those with mental illness in navigating the emergency room process.

In addition to these specific programs, the roundtable has also implemented community support initiatives such as the Integrated Primary and Behavioral Health Care program, which aims to improve the coordination and integration of primary and behavioral health care, and the Strong Kids, Strong Families program, which provides support and resources to families with children experiencing mental health challenges.

Take-Aways: There are several ways that the East Metro Mental Health Roundtable's concepts and initiatives could be applied to provide SUD and mental health care at the SUD facility. Some potential options include:

Identifying and tracking key SUD care metrics: One of the roundtable's first initiatives was to identify and track key mental health care metrics to identify gaps in the system and track progress. This could be done for SUD care as well to identify areas where care is lacking or where there are inefficiencies in the system, and to track progress over time.

Implementing programs to improve care and reduce costs: The roundtable has implemented several programs that aim to improve care and reduce costs for treating mental illnesses, such as the Mental Health Drug Assistance Program and the Integrated Primary and Behavioral Health Care program. These programs could be replicated at the SUD facility to improve care and reduce costs for patients with SUD.

Providing education and resources: The roundtable has made efforts to educate the public about mental health issues and the importance of seeking treatment when needed. The SUD facility could follow this example by providing information and resources on their website and participating in public events and campaigns to raise awareness about SUD.

Implementing prevention initiatives: The roundtable has implemented several initiatives that aim to prevent mental health crises, such as the Mental Health Drug Assistance Program and

the Mental Health Crisis Stabilization service. The SUD facility could adopt similar initiatives to prevent SUD crises and reduce the need for emergency care.

Reducing the use of emergency room and other resources: The roundtable's efforts have led to a reduction in the use of emergency room, hospital, and legal resources for mental health issues. The SUD facility could adopt similar initiatives to reduce the use of these resources and improve the overall efficiency of care.

Overall, by applying the concepts and initiatives of the East Metro Mental Health Roundtable, the SUD facility could make significant improvements to mental health care in the community and have a positive impact on the lives of those with SUD illness and their families.

Roundtable members include: Allina Health, Canvas Health, Catholic Charities Twin Cities, Children's Hospital, City of St. Paul, CLUES (Comunidades Latinas Unidas En Servico), Dakota County Social Services, East Metro Crisis Alliance, Emergency Care Consultants, Fraser, Guild Incorporated, Hamm Clinic, HealthEast, HealthPartners, Hearth Connection, Mental Health Resources, Minnesota Department of Health, Minnesota Department of Human Services, Minnesota Philanthropy Partners, National Alliance for Mental Illness Minnesota, People Incorporated, Ramsey County District Court, Ramsey County Human Services, Regions Hospital, St. Joseph Hospital, St. Paul Police Department, St. Paul Public Schools, United Hospital, Washington County Community Services, Westside Community Health Services, Amherst H. Wilder Foundation.

Other Partnership Examples

A broad-based internet search on public-private partnerships suggests the engagement target is narrowly focused to either a defined group of beneficiaries or addressing a specific behavioral health issue. These partnerships function within the sphere of behavioral health services but often work in isolation from other complementary services. There is an argument to be made that a focused effort is more impactful, but it potentially addresses a narrow subset of individuals. Other partnerships that are more contractual in nature, such as an operating agreement or joint venture, can fully define operating terms and establish success measures. These also tend to focus on a certain subset of the behavioral health eco-system and generally, their intent is to build capacity and operating structure to support a well-defined patient category.

In all, a successful partnership must include a specific range of services and their beneficiaries. A narrow focus can help establish goals and movement along the learning curve helps inform best practices and sets the stage for expansion.

Conclusion

The new SUD facility should explore strategic partnerships to streamline care delivery across providers to effectively address the SUD continuum in their region. Patients struggling with an addiction often receive care across this continuum and have multiple comorbidities, so the success of their treatment depends on effective communication, coordination, and treatment among all providers on the continuum, including primary care.

One way to accomplish this is by forging partnerships between healthcare providers, payers, employers, educational entities, and public agencies through public and private partnerships. These partnerships can help to improve communication and coordination between all the different parties involved in a patient's care and can also help to elevate the level of treatment provided across all points of care. Additionally, these partnerships can allow patients to move more seamlessly through the continuum of care, which is particularly important for patients struggling with SUD issues.

It is essential for DBHDS to identify and track key SUD metrics to identify areas for improvement and measure progress. This will serve as a way of determining the most effective partnerships across the continuum of care moving forward. To achieve this, collaborations involving multiple stakeholders such as primary care practices, residential treatment facilities, outpatient care, hospitals, behavioral health providers, social service agencies, and other community-based organizations, are necessary. These stakeholders provide support and resources to patients outside of the healthcare setting.

Services on Catawba Hospital's current campus that would benefit from such partnerships include hiring a private entity for administrative support for the new residential treatment program and the outpatient clinic. Furthermore, educational and workforce services can also be in the outpatient building, which can be managed by a private entity. This will help bridge the gap in the current system and create a more effective continuum of care and provide more comprehensive support for those dealing with SUD issues.

Partnerships with Academic Medical Centers (AMCs) can also be advantageous for SUD treatment facility, by creating opportunities for research engagement and mutually beneficial service structures such as training for students in fields such as social work, nursing, psychiatry, and psychology, and providing internships, in rural communities where patients face unique challenges. Collaborating with academic institutions can also improve access to SUD services for specific populations and implement innovative care models to enhance the quality of care.

Research and laboratory space with a focus on emerging technologies in SUD treatment can also be beneficial. There are several advantages of partnering with private entities to train different types of providers such as social workers, nurses, psychiatrists, and psychologists, provide alternative programming, and provide internships. These include:

Access to Specialized Expertise: Private entities often have specialized expertise in certain areas such as providing training, education, or services. By partnering with them, SUD facility can benefit from this specialized knowledge, resources, and improve the quality of care provided to patients.

Cost Effectiveness: Private entities may have the resources and financial capabilities to provide training, education, and services in a cost-effective manner.

Flexibility: Private entities may be more nimble and able to respond to changing market conditions and trends in healthcare. which can be an important advantage in a rapidly evolving healthcare landscape.

Innovation: Private entities are often at the forefront of innovation in healthcare and may be better equipped to adopt and implement new technologies, approaches, and practices that can help improve the quality of care provided to patients.

Additional Financial Resources: By partnering with private entities, DBHDS may have access to additional financial resources that can be used to improve and expand services, purchase new equipment, or invest in research and development.

Provide Alternatives: Private entities may provide different models of care or different approaches to care that may be beneficial for patients that did not respond well to traditional methods, or for patients with special needs.

Catawba Hospital already collaborates with a number of regional providers and educators, including the Virginia Tech School of Medicine, Radford University, and the local Hospital Corporation of America (HCA) and Carilion Clinic. These partnerships enhance the current staff and students on the campus but also provide a ready-made pipeline of clinicians, students, educators, researchers and others. For example, staff psychiatrists hold faculty positions and help educate psychiatry residents and medical students on the campus. The hospital also offers clinical practicum opportunities for students in various fields, such as nursing, psychology, social work, music therapy, recreation therapy, food, and nutritional services.

This collaboration, combined with connections to organizations such as Blue Ridge Behavioral Health Care, provides an opportunity to form a network for community partnerships, project sponsorships, and the implementation of innovative SUD care models. The new SUD facility can collaborate with academic partners to improve patient outcomes and enhance the overall quality of care for SUD patients in the community.

KEY CONSIDERATIONS FOR SUCCESSFUL PPPS

+ **Clear Goals**
+ **Transparent Governance Structure**
+ **Mutually Beneficial Agreements**
+ **Effective Communication and Collaboration**
+ **Performance Metrics and Accountability**
+ **Balancing Act**

Partnerships under a public-private partnership arrangement (PPP) can facilitate the shared responsibility of providing access to the continuum of care in the region, along with the shared rewards. Under a PPP, a partnered company could be responsible for managing the day-to-day operations of the new SUD facility, such as the new residential treatment program and outpatient facility. This could include responsibilities such as hiring and supervising staff, managing budgets, and providing clinical services to patients. The public sector, represented by DBHDS, may provide funding for the facility and set performance standards and quality benchmarks for the private company to meet. The partner company may also be required to meet certain financial and performance targets set by DBHDS, such as reducing costs or improving the quality of care.

These partnerships could allow the SUD facility to provide its services to new geographic areas or populations that may not have been served otherwise, including marginalized populations and low-income communities of color. PPPs are beneficial because they can bring private sector expertise and efficiency to the delivery of public services provided by DBHDS. These partnerships with the private sector can also bring additional financial resources which can be used to improve and expand services, purchase new equipment, or invest in research and development. Additionally, private sector partners may have expertise in managing and operating SUD facilities more efficiently, leading to cost savings and improved quality of care, not to mention new technologies, approaches, and practices that may not be possible without private sector participation.

To implement successful partnerships, it is important to develop a clear roadmap or process for transitioning completed projects to stakeholder agencies and establish well-defined terms of engagement for partnerships. This includes setting clear goals and objectives, outlining the roles and responsibilities of each partner, and establishing a system for communication and collaboration. Additionally, it is important for DBHDS to have a method for evaluating the impact and effectiveness of their projects and initiatives and be prepared to update their approach as

needed, to continuously improve the quality of care provided to patients. Performance metrics describing the program's impact may include shared ones among the partners or internal ones that are specific to the organization. Agreements or metrics tied to financial elements must be chosen with care, so they are in accordance with legal requirements like Stark, anti-kickback laws. Still, public reporting emphasizing cost savings may be needed but how those estimates are developed may be expressed in general terms. For instance, emergency room visits may be a calculation of average cost per outpatient visit multiplied by the number of estimated patients not seeking care in that venue. Any performance metrics associated with the collaboration should have an established baseline to reference impact.

There are other PPP models that can be beneficial for the transformation of Catawba Hospital campus and the creation of the new SUD facility. Some of these models may require legislative approval before they can be enacted or even explored such as the model used for the Virginia Center for Behavioral Rehabilitation (VCBR) [§ 37.2-909(A)], which focused on patients with dual diagnoses of behavioral health and addiction disorders.

By building relationships with a wide range of partners, Catawba Hospital can create a more comprehensive and integrated approach to care that is better equipped to meet the needs of patients. This includes partnering with other hospitals, primary care providers, social service agencies, educational institutions, private companies, and other organizations that can provide support and resources to patients both within and outside of the healthcare setting. A diverse network of partners can help ensure that patients have access to a full range of services, including preventive care, early intervention, and ongoing support and resources. This will make it possible for the new SUD facility to provide care that is tailored to the specific needs of patients and improve the overall health outcomes in the region.

Resources:

Acadia Healthcare. Integrative Behavioral Health Partnerships

Milwaukee County Behavioral Health Services. Community-centric partnership

Associations Between Cross-Sector Partnerships and Local Health Department Participation in Population-Based Activities to Prevent Mental Health Conditions. Overview of partnerships with local health departments (LHDs) and community organizations

The East Metro Mental Health Roundtable
https://www.healthpartners.com/ucm/groups/public/@hp/@public/documents/documents/entry_202255.pdf

Potential Public-Private Care Partners (Operators and Providers)

As we explore potential partnerships for the SUD facility project, it is essential to understand the diverse landscape of service providers and how each can contribute to the vision of transforming substance use disorder treatment in the region. We have categorized potential partners into several groups, each bringing unique strengths and capabilities. DBHDS will need to support the selected operator with the treatment of patients that are complex level 4. These patients have co-occurring SUD and severe mental health issues. Once the mental health issues are treated, the patient can continue with the SUD treatment in their journey to healing.

SUD Provider Selection Process

It is imperative that the SUD provider selected to collaborate with DBHDS provide the ASAM continuum of care to patients in the new SUD facility. This public-private partnership aims to enhance the provision of substance use disorder (SUD) services across the region.

ASAM treatment levels:

- Outpatient (<9h a week) [1.0/ 1.5, 1.7]
- Intensive outpatient (>9h a week) [2/ 2.1, 2.5]
- Partial Hospitalization (20h a week) [2/ 2.7]
- Inpatient/Residential (24h a day)
  - 3.1 Low Intensity Residential
  - 3.5 High Intensity Residential Services
  - 3.7 Medically Monitored Intensive Inpatient
- Medically Managed and Psychiatric Inpatient Services
  - 4.0 Medically Managed Inpatient Services
  - 4.0 Medically Managed and Psychiatric Inpatient Services

Preliminary Criteria:

Potential partners have strategically been categorized into three distinct groups. This classification is crucial for aligning each partner's unique strengths and capabilities with the specific needs and goals of the project. By organizing partners into Potential Full-Service Providers, Community Services Boards (CSBs), and provider partners, a comprehensive network is created that not only addresses the full spectrum of SUD treatment from outpatient to medically monitored intensive inpatient care, but also leverages local expertise and promotes community-based support.

Potential Full-Service Providers are selected for their experience and capability to manage and deliver a complete range of SUD services. Their operational presence and expansion potential within and around Virginia are critical for ensuring accessibility and continuity of care across the region. Community Services Boards are integral due to their deep community ties and proven record in public service, making them essential for reaching and serving the local population effectively. Finally, provider partners play a pivotal role by enhancing the core treatment

services with additional support, aftercare, and educational programs, thus supporting a holistic treatment approach.

- Potential Full-Service Providers Criteria:
  - Capable of delivering a full spectrum of SUD services including outpatient, inpatient, and long-term rehabilitation.
  - Must have operational facilities within or near Virginia or show a clear interest and capability to expand services to Virginia.
  - Demonstrated experience in managing multi-level care systems as defined by the ASAM continuum.
  - Preference for providers with a strong regional presence and an established network across multiple states.
- Community Services Boards (CSBs) Criteria:
  - Must provide mental health, substance abuse, and developmental services within specific geographical areas in Virginia.
  - Strong community ties and a track record of public service.
  - Experience in collaborative projects with other healthcare systems or government entities.
- Provider Partners Criteria:
  - Organizations that complement full SUD treatment services with support services, aftercare, prevention programs, or educational initiatives.
  - Experience in partnership models that enhance service delivery and patient outcomes.

This structured approach to partner selection ensures that the project harnesses diverse but complementary capabilities. This will foster a robust treatment environment that is responsive to the complex needs of individuals with SUD. By evaluating potential partners based off of this tailored criteria, we can build a collaboration that is not only effective in delivering high-quality care but also sustainable and integrated within the community it serves.

<u>Selection Process:</u>

- Research Strategy:
  - Utilize multiple sources including Google searches, provider websites, professional and government resources such as SAMHSA, and consultations with industry experts.
  - Evaluate providers based on publicly available data to gauge their interest and capabilities in participating in the SUD facility project.
- Evaluation:
  - Providers will be evaluated based on the detailed criteria specified for each category.
  - A scoring system will be developed to quantify provider alignment with project goals, operational capabilities, and potential for successful collaboration.
- Interviews and Meetings:
  - Listed providers will be invited for detailed discussions to explore potential partnerships.

- Discussions will focus on specific organizational capabilities, project alignment, and strategic goals for SUD treatment enhancements.

State Inclusion Criteria:

Once the preliminary interviews and assessments have been conducted, resulting in a carefully curated list of potential partners, it is crucial to proceed with a more in-depth evaluation. This final assessment will ensure that potential partners not only meet the basic eligibility criteria, but also excel in areas critical to the long-term success and sustainability of the SUD facility project. The following state inclusion and exclusion criteria will guide this comprehensive evaluation:

- Experience and Expertise in SUD Services:
  - Extensive experience in managing and delivering SUD treatment programs.
  - Proven track record of effective patient outcomes and evidence-based practices.
- Financial Stability:
  - Demonstrates financial health and sustainability.
  - Capable of handling long-term commitments and potential financial risks associated with public-private partnerships.
- Operational Capacity:
  - Adequate staffing, technology, and infrastructure to scale up operations or integrate new services seamlessly with existing offerings.
- Compliance and Accreditation:
  - Fully compliant with state and federal regulations related to healthcare and SUD treatment.
  - Holds necessary accreditations from relevant bodies, ensuring quality standards.
- Cultural and Community Engagement:
  - Strong ties to the community and a history of effective engagement with local organizations and stakeholders.
  - Demonstrates cultural competence in delivering services to diverse populations.
- Innovation and Adaptability:
  - Commitment to innovation in treatment methods and service delivery.
  - Ability to adapt to changes in the healthcare landscape and patient needs.
- Strategic Alignment:
  - Organizational goals and values that align with the vision and mission of DBHDS and the SUD facility project.
  - Willingness to collaborate on achieving shared objectives.
- Diversity of Funding Sources:
  - Provider has experience with a diverse range of funding sources such as Medicare, Medicaid and private insurance.

State Exclusion Criteria:

- Regulatory Non-Compliance:
  - History of significant violations of healthcare regulations or sanctions by regulatory bodies.
- Financial Risks:

    - Recent financial instability or significant operational losses could jeopardize the partner's ability to sustain the partnership.
- Poor Performance Outcomes:
    - Documented issues with patient care, treatment outcomes, or dissatisfaction among stakeholders.
    - Lack of transparency or accountability in reporting treatment results.
- Limited Capacity:
    - Inadequate resources to scale up operations or lack of infrastructure to support a large-scale project.
- Ethical Concerns:
    - Past ethical breaches, including issues with patient confidentiality, data security, or conflicts of interest.
- Cultural Incompetence:
    - Lack of policies or practices that promote cultural competence and inclusivity.
- Lack of Interest in Collaborative Growth:
    - Previous unwillingness to engage in partnerships or collaborative projects that require shared decision-making and integrated service delivery.

Potential Full-Service Providers

These providers are organizations capable of delivering a comprehensive range of SUD services (including integrated services for those with co-occurring disorders), from initial assessment through various levels of care including medically managed detoxification, residential, various levels of outpatient, and long-term recovery support.

- **Regional Multi-state Provider - in Virginia:** These providers operate in multiple states including Virginia, offering extensive resources and broad geographical coverage, which can facilitate integrated care and support networks.
- **Regional Multi-state Provider - not based in Virginia:** These providers bring diverse experiences and practices from other regions and may potentially be interested in expanding to Virginia.
- **Out of State Local Provider (NC, WV)** Providers based in neighboring states like North Carolina or West Virginia. They can offer services to border regions and share cross-state insights that might be interested in the SUD facility project.

Community Services Boards

Community Services Boards (CSBs) are public agencies that provide mental health, substance use disorder treatment, and developmental services within specific geographical areas of Virginia. These boards are crucial for ensuring that community-based public services are available, especially to individuals who may not have access to private care. CSBs occupy a unique niche in the Healthcare system that is critical for effective and timely care. A full discussion of the role of the CSBs is provided later in this section.

Provider Partners:

These are organizations that may not directly provide full SUD treatment services but play essential roles in a comprehensive care continuum. These include entities specializing in support services, aftercare, prevention programs, education, training, or non-traditional therapies that complement mainstream SUD treatment. Provider partners are vital for holistic care models that address all aspects of recovery, including physical health, mental health, community reintegration, staffing and ongoing support.

Providers List (The providers are **not** listed in any order of preference)

Potential Full-Service Providers

1. Regional Multistate Provider - in Virginia:
   a. Acadia Healthcare
   b. Pinnacle Treatment Centers
   c. Sandstone Care
   d. Pyramid Healthcare
   e. Summit Behavioral Health Care
2. Regional Multistate Providers - not in Virginia:
   a. Caron
   b. Banyan Treatment Center
   c. Recovery Centers of America (RCA)
   d. The Recovery Village:
   e. American Addiction Centers (AAC)
   f. Advanced Recovery Systems
3. Out of State Nearby Providers (NC, WV):
   a. FMRS Health System
   b. Southern Highlands Community Mental Health Center (SHCMHC)
   c. Daymark Recovery Services
   d. Fellowship Hall
   e. Crestview Recovery Services

Community Services Boards (The CSB's are **not** listed in any order of preference)

1. Blue Ridge Behavioral Healthcare
2. Healthcare
3. Mount Rogers Community Services Board (MRCSB)
4. Region Ten Community Services Board
5. Piedmont Community Services Board
6. Danville Pittsylvania Community Services Board
7. Southside Community Services Board

Provider Partners (The provider partners are **not** listed in any order of preference)

1. HCA Healthcare System
2. Novant Health system
3. Hazelden Betty Ford Foundation
4. UVA Health
5. Carilion Clinic
6. Centra
7. VCU Health
8. Sentara

Community Services Boards

The SUD facility project is dedicated to creating a comprehensive and integrated continuum of care for individuals with substance use disorders. In Virginia, Community Services Boards (CSBs) are pivotal in providing public mental health, developmental, and substance use disorder services. Established under the Code of Virginia, CSBs function as the single point of entry into publicly funded behavioral health services, ensuring that individuals receive the care they need within their communities.

There are 40 CSBs across Virginia, each responsible for delivering a range of core services including emergency, outpatient, case management, day support, residential, and prevention services. These boards operate either as independent entities or as part of local government departments, and they play a vital role in coordinating care, advocating for individuals, and educating the community.

However, despite their extensive service offerings and community integration, CSBs may not be the best fit for a full-service provider partnership in the context of the SUD facility project. This section explores the reasons behind this assessment and highlights the potential for CSBs to contribute meaningfully to the project in alternative roles. By understanding the strengths and limitations of CSBs, we can better position the SUD facility project for success through strategic partnerships and collaborations.

Why CSBs Are Not the Best Option for Full-Service Partnership:

CSBs play a vital role in the provision of public community mental health, developmental, and substance use disorder services. However, there are several reasons why they may not be the optimal choice for a full-service provider partnership in the context of the SUD facility project:

- *Scope of Services:* CSBs serve as the single point of entry into publicly funded mental health, developmental, and substance use disorder services. They are structured to provide a broad range of services, often through multiple funding streams and regulatory frameworks, which might limit their ability to offer the specialized, integrated, and comprehensive continuum of SUD care required by the SUD facility project.
- *Resource Allocation and Focus:* CSBs typically manage a wide array of services, including mental health, developmental disabilities, and substance use disorders. This

broad focus can dilute their resources and attention from the specialized needs of SUD care, which requires targeted interventions and dedicated resources.

- *Funding and Administrative Complexity:* The funding mechanisms for CSBs involve a mix of state, local, and federal funds, including Medicaid. This complexity can lead to challenges in aligning their administrative and financial systems with the specific requirements of a full-service SUD provider partnership.
- *Operational Limitations:* Many CSBs operate under significant administrative policies and regulations set by local governments and the Virginia Department of Behavioral Health and Developmental Services. These constraints can limit their flexibility and responsiveness, which are crucial for the dynamic needs of a full-service SUD care provider.

Benefits of Partnering with CSBs in a Different Capacity:

While CSBs may not be ideal full-service providers for the Catawba Hospital project, their deep-rooted presence in the community and broad range of services make them invaluable partners in complementary roles. Engaging CSBs in a supportive capacity can bring numerous benefits to the project, enhancing its reach and effectiveness. CSBs offer substantial advantages when leveraged in a collaborative partnership:

- *Community Integration and Access:* CSBs are deeply embedded in the community and serve as key access points for individuals seeking behavioral health services. Their role as the single point of entry into public services ensures they have extensive knowledge of and connections within the community.
- *Advocacy and Education:* CSBs are strong advocates for individuals receiving services and are instrumental in community education and awareness. They can effectively mobilize community resources and support for the project.
- *Case Management and Coordination*: CSBs excel in case management, service coordination, and discharge planning. These functions are critical for ensuring continuity of care and seamless transitions between different levels of care within the SUD treatment continuum.
- *Emergency and Ancillary Services:* CSBs provide essential emergency services and ancillary support, which can complement the primary SUD treatment services offered by the full-service provider. This can include crisis intervention, emergency assessments, and ancillary services like motivational treatment and early intervention.

By capitalizing on these strengths, the SUD facility project can build a more resilient and comprehensive care system, ultimately fostering better outcomes for individuals with substance use disorders.

Proposed Partnership Framework with CSBs:

To maximize the impact and effectiveness of the SUD facility project, it is crucial to develop a strategic partnership framework with CSBs. While CSBs may not serve as full-service providers, their established roles in the community, extensive experience, and wide-ranging capabilities make them ideal partners in several complementary areas. By integrating CSBs into specific

aspects of the project, we can leverage their strengths to enhance service delivery and ensure a seamless continuum of care for individuals with SUD. The following proposed partnership framework outlines key areas where CSBs can contribute significantly to the success of the project:

- *Referral and Access Points:* Establish CSBs as key referral partners for initial screenings and assessments. This can help in identifying individuals who need intensive SUD services and ensuring they are directed to the appropriate full-service provider at the SUD facility.
- *Case Management and Follow-up:* Leverage CSB expertise in case management to handle follow-up care and long-term recovery support for individuals post-discharge from intensive SUD treatment. This ensures continuity of care and better long-term outcomes.
- *Community Outreach and Education:* Engage CSBs in community outreach and educational initiatives to raise awareness about SUD and the services offered at the SUD facility. Their established presence in the community can amplify these efforts.
- *Integrated Data Systems:* Establish integrated data-sharing systems between CSBs and the full-service provider to track patient progress, share treatment plans, and coordinate care more effectively. This can improve communication and ensure that all parties are informed about the patient's status and needs.
- *Collaborative Care Planning:* Develop joint care planning protocols where CSBs and the full-service provider collaborate on treatment plans for individuals with complex needs. This can ensure comprehensive care that addresses both immediate and long-term needs.

By strategically partnering with CSBs in these capacities, the SUD facility project can enhance its service delivery model while leveraging the strengths and community presence of CSBs. This collaborative approach will help achieve better outcomes for individuals with SUD, ensuring they receive comprehensive, coordinated, and compassionate care.

Potential Funding Source – Opioid Settlement Funds

The National Opioid Settlement represents a significant milestone in the ongoing efforts to address the devastating impact of the opioid epidemic in the United States. The settlements, spanning across 2021 to 2024, have been crucial in bringing resolution to litigation involving major pharmaceutical distributors, manufacturers, and pharmacy chains. The National Opioid Settlement represents a significant chapter in the United States' ongoing battle against the opioid crisis. This legal resolution involves numerous pharmaceutical companies and distributors and aims to address the extensive damages wrought by the opioid epidemic. This section will provide an overview of the settlement at a national level, and then focus specifically on how these funds are being allocated and used within the state of Virginia and how DBHDS may be able to get access to these funds for the SUD facility Project.

Overview of the National Opioid Settlement

The National Opioid Settlement is a culmination of numerous lawsuits filed by state and local governments against major pharmaceutical companies and distributors. These companies were accused of contributing to the opioid crisis by aggressively marketing opioids and failing to prevent drug diversion, leading to widespread addiction and overdose deaths.

At the core of the settlements are substantial financial agreements aimed at funding opioid abatement efforts. The 2021 settlements saw distributors committing up to $21 billion over 18 years, with an additional $5 billion from the manufacturer, Janssen Pharmaceuticals, Inc. and its parent company, Johnson & Johnson. Building upon this foundation, the 2022 settlements further solidified the financial support, with Teva, Allergan, CVS, Walgreens, and Walmart pledging significant sums over varying timelines, collectively amounting to approximately $50 billion.

Beyond the financial aspect, the settlements introduce pivotal changes to the business operations of the defendants, emphasizing the need for responsible practices and enhanced transparency in the supply chain. Distributors are mandated to establish a clearinghouse for monitoring and reporting suspicious opioid orders comprehensively, signaling a shift towards greater accountability and oversight. Manufacturers like J&J, Teva, and Allergan have agreed to stringent limitations on their marketing, promotion, and distribution of opioids, ushering in a new era of responsible pharmaceutical practices.

Moreover, the settlements underscore a commitment to directing a substantial portion of the funds towards opioid abatement efforts. A minimum of 85% of the proceeds destined for participating states and subdivisions must be allocated for initiatives aimed at combatting the opioid epidemic, ensuring that the resources are channeled towards impactful solutions and support for affected communities. This emphasis on abatement efforts underscores a collective resolve to address the multifaceted challenges posed by the opioid crisis.

The collaborative nature of the settlements is evident in the extensive negotiations involving State Attorneys General, legal committees, and representatives of the defendants, overseen by Judge Dan Polster and supported by experienced mediators. These negotiations have culminated in comprehensive agreements that prioritize accountability, transparency, and a concerted effort to mitigate the far-reaching consequences of the opioid epidemic.

As the Opioid Settlement unfolds, it sets a precedent for meaningful industry reforms and collaborative initiatives to combat public health crises effectively. Through financial commitments, operational changes, and a focus on abatement efforts, these settlements offer a pathway towards lasting solutions and a renewed commitment to addressing the opioid epidemic at its core.

Local Virginia Summary Regarding the Settlement

In Virginia, the impact of the opioid settlement is particularly significant. The Commonwealth has developed structured plans to distribute and utilize the settlement funds to maximize the public health response to the opioid epidemic. Virginia's share of the settlement is substantial, with various counties and cities receiving funds based on the severity of the crisis locally as well as the population affected: https://www.oaa.virginia.gov/media/governorvirginiagov/oaa/img/news-and-announcements/Opioid-Abatement-Authority-Announces-22.7M-in-Annual-Grant-Awards.pdf

Notably, Virginia expects to receive about $1.1 billion from litigation against manufacturers, distributors, and pharmacies alleged to have contributed to the opioid crisis. Payments from these settlements and bankruptcies began in 2022 and are expected to conclude by 2041. The anticipated total payout of $1.1 billion resulting from the settlements with opioid manufacturers and distributors signifies a significant influx of resources for addressing the opioid crisis in Virginia.

Virginia's approach includes a strategic division of funds: a certain percentage is allocated directly to state initiatives, while a significant portion is distributed among localities. This local funding is used for programs that include enhancing mental health services, expanding treatment facilities, and increasing the availability of life-saving medications like Naloxone.

Moreover, Virginia established the Opioid Abatement Authority to ensure that the funds are used specifically to address the opioid crisis within the state. This authority oversees the distribution and use of the money, ensuring transparency and accountability. The programs funded by these resources are designed to produce measurable improvements in public health, reduce overdose deaths, and support recovery and rehabilitation services.

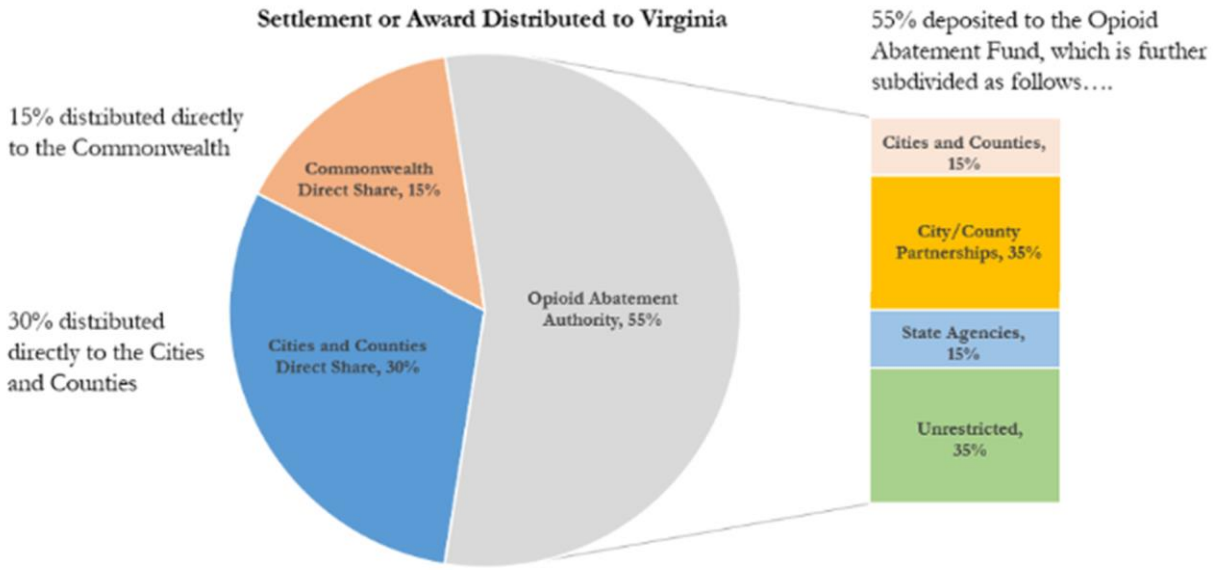
The OAA was created as a pivotal part of Virginia’s strategy to combat the opioid epidemic that has significantly affected the state. Its primary role is to foster partnerships across Virginia's cities, counties, state agencies, and service providers. These collaborations aim to enhance the spectrum of services available for education, prevention, treatment, and recovery from opioid use disorder and associated mental health conditions.

The financial backbone of the OAA's operations is the settlement funds received from opioid-related litigation. Notably, Virginia has been a beneficiary of substantial settlements from entities within the opioid distribution network, including a $13 million settlement from McKinsey, and

larger settlements from major distributors (McKesson, Cardinal Health, AmerisourceBergen) potentially totaling $21 billion, as well as up to $5 billion from Janssen Pharmaceuticals. These funds are meticulously allocated through a Memorandum of Understanding (MOU), agreed upon by all 133 Virginia counties and cities, which ensures that funds are distributed based on a per capita measure of harm.

On February 23, the Virginia Opioid Abatement Authority allocated $537,076 in grants to five Virginia communities for opioid abatement and remediation efforts. The OAA began accepting annual grant applications for 2024 and 2025 in October 2023, with a submission deadline of April 1, 2024. Some grants may be awarded on a rolling basis during this period, but the majority will be distributed after the application cycle concludes.

As payments from these settlements are distributed and received, localities should be mindful that different settlements often have varying requirements concerning permissible uses of the funds, recordkeeping, and reporting. Additionally, the Commonwealth's Opioid Abatement Fund and Settlement Allocation Memorandum of Understanding (MOU), which all Virginia localities have approved, contains relevant provisions regarding the use of opioid settlement funds.



Virginia's strategy for fund allocation involves a multi-tiered approach:

- **State Initiatives/Commonwealth (15%):** A portion of the funds—15%—is directly allocated to state initiatives. This state share is managed through Virginia's regular budget process, ensuring alignment with ongoing public health efforts.
    - This "Commonwealth Share" is managed through Virginia's regular budgetary process, ensuring these funds align with ongoing public health efforts and statutory requirements. The Commonwealth's share is deposited into the Attorney General's Regulatory, Consumer Advocacy, Litigation, and Enforcement

Revolving Trust Fund, with transfers to the Commonwealth's General Fund as applicable. This structured approach ensures that the funds are used strictly for opioid abatement or similar purposes, following the stipulations of specific settlements.

- **Direct Distribution /Cities and Counties (30%):** Another 30% of the funds are distributed among localities. This local funding is critical for tailoring responses to the specific needs of communities, supporting programs such as the enhancement of mental health services, expansion of treatment facilities, and increased availability of life-saving medications like Naloxone. Each participating city and county receives a predetermined share based on the division outlined in Exhibit A of the MOU (each county receives a certain percentage, for example, Roanoke will get 1.5%)), ensuring a fair and impactful distribution that reflects the local severity of the opioid crisis.
    - Application: This funding could be pivotal in ensuring that the facility serves the local community effectively. Investments could be channeled into local infrastructure improvements, local workforce training, or enhancing local services that will support the facility, such as transportation, housing, and community-based recovery programs. While primarily aimed at local projects, a portion of this funding could be used to enhance local infrastructure around Catawba Hospital that supports the new facility. This might include upgrading local roads, utilities, or other municipal services necessary for the new facility's operations.
- **Virginia Opioid Abatement Fund (55%):** The largest share, amounting to 55%, is allocated to the Virginia Opioid Abatement Fund. This fund is managed by the newly established Opioid Abatement Authority, which is tasked with making grant awards and disbursements to support a wide array of initiatives aimed at combating the opioid crisis.
    - Application: This fund is crucial as it supports comprehensive initiatives aimed directly at combating the opioid crisis. Given its broad scope, it could support various aspects of the facility's development—from initial studies to implementation, construction, and operational phases.
    - <u>Distribution to Cities and Counties/OAA Individual Distribution (15% of OAA Funds)</u>
        - Each city and county in Virginia can access a predetermined share of OAA funds, conditional upon adherence to specific terms set out in a statewide Memorandum of Understanding (MOU). These localities must apply to the OAA and receive approval for the intended use of the funds, ensuring alignment with the overall objectives of opioid crisis mitigation.
        - Application: This part of the funding could be used to ensure that localities are equipped to provide ongoing support to the facility, possibly through local health services, emergency services, and integrating community care with facility-based services. This funding could be utilized to ensure that the facility is integrated into the local community by providing funds for community-based programs or services that will

support the patients and staff of the new facility, like housing programs for patients receiving long-term treatment.

- Cooperative Projects (35% of OAA Funds)
  - The Opioid Abatement Authority (OAA) facilitates and finances collaborative projects that involve two or more cities or counties, aiming to enhance regional efforts in opioid abatement and remediation. The OAA Board prioritizes projects that expand successful programs or initiate them in new areas, address communities with high rates of opioid misuse or related fatalities, serve historically economically disadvantaged communities, and match OAA funds with additional financial contributions from the applicants.
  - Application: Utilizing these funds could be highly beneficial for developing parts of the facility that involve collaboration between multiple jurisdictions or public-private partnerships. This could include shared services or facilities that span across city or county lines, enhancing regional capacity for SUD treatment. Since the facility might serve a broader regional need and involve multiple jurisdictions, using these funds for parts of the project that require collaboration or integration with other services across the region would be appropriate. This can include shared technology systems, joint training centers, or other infrastructure that supports a network of care.
- State Agency Distribution (15% of OAA Funds)
  - Funds are also allocated to state agencies that are directly involved in addressing the opioid crisis. This distribution is managed through a separate process, ensuring that state-level initiatives are also supported.
  - Application: Since the project involves state-operated facilities, these funds could specifically support infrastructure developments, staffing, and operational systems that are directly managed by state agencies. This ensures that state-level initiatives align with broader public health strategies and comply with regulatory requirements. Given that the facility is state-operated, these funds could be specifically used for aspects of the project that align with state health initiatives, such as integrating state-of-the-art technology systems for patient management or building research facilities that can also serve state health services.
- Unrestricted Funds/OAA Gold Standard (35% of OAA Funds)
  - A significant portion of the Opioid Abatement Fund is unrestricted, which provides the OAA Board flexibility to fund administrative costs and support projects that may not fall under the other specified categories. This segment includes the OAA's "Gold Standard" Incentive, which rewards cities and counties for outstanding efforts in opioid abatement and remediation. See next section for a more detailed breakdown as it relates to this funding source for Roanoke County.

Application: This segment allows flexibility in funding innovative projects that might not fall under traditional categories but are essential for opioid abatement. This could include unique architectural designs, advanced

medical equipment, or innovative treatment programs that are pilot projects or new to the state. This portion of the fund offers the greatest flexibility and could be directly allocated to the capital expenses associated with designing and building the facility. This can include architectural services, construction costs, and initial outfitting of the facility with necessary medical and operational equipment.

Funding to be Received by Roanoke County Breakdown

Direct Distribution: Direct distribution refers to the portion of the opioid settlement funds allocated directly to localities like Roanoke County. This is related to the section titled “Direct Distribution /Cities and Counties” in the above section. According to the “Virginia Opioid Abatement Authority County Estimated Settlement Funds Look-Up Tool,” Roanoke County is expected to receive a total of $3,376,717 in direct distributions over the next 15 years.

Craig County is another jurisdiction which recognizes the benefits to its residents of the initiatives being enacted at Catawba. The Craig County Board of Supervisors has proactively earmarked $85,000 of their Opioid Settlement funds to support those initiatives.

These direct distribution funds can be used for initiatives like enhancing mental health services, expanding treatment facilities, and increasing access to Naloxone. Localities receive these funds automatically from the settlement administrator without requiring an application. These funds are allocated based on the MOU’s predefined formula, which considers factors such as population and the local impact of the opioid crisis. According to the statewide MOU, Roanoke County has been allocated a specific percentage share of the opioid settlement funds, 1.498%. This allocation percentage applies to both the direct distribution and the OAA Individual Distribution, providing Roanoke County with substantial funding for opioid abatement efforts. The SUD facility Project can utilize direct distribution funds allocated to Roanoke County to support infrastructure improvements such as roads, utilities, and municipal services, as well as enhancing local services through community-based mental health and substance use disorder programs.

OAA Individual Distribution: The Virginia Opioid Abatement Authority (OAA) manages 55% of the settlement funds through its Opioid Abatement Fund. Roanoke County can access these funds via the OAA’s individual distribution program. The county is eligible to receive $1,170,504. Localities must apply to the OAA and adhere to specific terms outlined in the statewide Memorandum of Understanding (MOU). The funds can support initial implementation (feasibility studies and infrastructure development) and expanding services with additional treatment facilities and recovery programs.

OAA Gold Standard: The OAA Gold Standard Incentive rewards cities and counties for exceptional opioid abatement efforts. Roanoke County is eligible to receive an additional $292,626 by meeting specific criteria such as demonstrating measurable impact and implementing innovative abatement approaches. The SUD facility Project can strive for recognition by demonstrating excellence and innovation in opioid abatement through

improvements in architectural design, advanced medical equipment, and pilot programs. Collaborative efforts, such as partnerships with law enforcement, health departments, and non-profits, will further enhance the project's impact and support its eligibility for the incentive.

Accessing Funding for the SUD facility Project via the Opioid Settlement

The SUD facility project represents a critical initiative in Virginia's efforts to combat the opioid epidemic. With substantial funding opportunities available through the National Opioid Settlement, accessing these resources will be pivotal for ensuring the project's success.

Understanding Funding Sources and Allocations: To acquire funding from the Virginia Opioid Abatement Authority (OAA), it is important to understand the various funding sources and allocations. As described above, the OAA grants are divided into different shares: State Agencies Share (15% of total funds), Cities and Counties Share (30% of total funds), and the Opioid Abatement Fund (55% of total funds). The distribution of the Opioid Abatement Fund is further categorized into Local Distribution (15% of OAA funds), Cooperative Projects (35% of OAA funds), State Agencies (15% of OAA funds), and Unrestricted Funds (35% of OAA funds).

Grant Opportunities and Proposal Submissions: The project should identify relevant grant opportunities. The Virginia Opioid Abatement Authority is hosting in-person workshops in various cities to provide city and county officials with strategies on utilizing opioid settlement funds to combat the opioid epidemic at the local level. The attendance is limited to government and non-profit organizations. The most recent events are June 11th, 2024, in Hampton, VA; September 5th,2024, in Winchester, VA; and October 10th2024, in Fredericksburg, VA. The Virginia Opioid Abatement Authority (OAA) also invites state agencies to submit proposals for abatement projects for the 2024-2025 period. The OAA will accept submissions from March 19, 2024, to May 24, 2024. Agencies may apply for new funding or propose renewals and amendments for existing projects. Additionally, some grants may be awarded on a rolling basis for urgent or high-impact projects. To access proposals and supporting documents through the OAA's Grants Portal, visit https://www.oaa.virginia.gov/portal-grants/.

Aligning with OAA Grant Priorities: To increase the chances of acquiring funding, the project should align with the OAA's grant priorities. Emphasizing the project's role in addressing regional impact, enhancing treatment facilities, and fostering collaboration with localities can aid with this. Highlighting how the SUD facility Project serves a significant regional need, making it eligible for cooperative project grants will also provide aid. Additionally, the project's focus on creating a state-of-the-art treatment facility aligns perfectly with abatement efforts.

Crafting a Comprehensive Proposal: A comprehensive proposal is crucial for acquiring funding. The proposal should include a detailed project overview, a statement of need showcasing the specific needs of the region, and a budget outlining the use of funds. Additionally, one should provide a comprehensive implementation plan, key performance indicators to measure success, and relevant supporting documentation such as previous studies and stakeholder engagement letters. Once the proposal is finalized, it should be submitted through the OAA Grants Portal.

Strategic Utilization of Settlement Funds: The strategy for utilizing the Opioid Settlement

funds involves targeting specific funding categories. For the State Share Allocation (15%), apply directly through DBHDS to leverage these funds for initial feasibility studies and infrastructure improvements. For the Local Distribution (Cities and Counties - 30%), collaborate with surrounding localities to coordinate funding and use the local share for improving infrastructure, enhancing community-based services, and integrating mental health and substance use disorder services.

For the Opioid Abatement Fund (55%), focus on cooperative projects involving multiple jurisdictions to create a regional treatment network. The State Agency Distribution (15% of OAA funds) should support state-managed aspects such as research and patient management. Leverage the Unrestricted Funds (35% of OAA funds) for innovative designs and pilot programs.

Collaborating with Key Stakeholders: Collaborating with key stakeholders such as local law enforcement, health departments, and non-profits will help build a comprehensive support network, integrating community-based programs with the hospital's services. Additionally, establish a monitoring and reporting system to ensure compliance with funding requirements and regularly report progress to the OAA.

By aligning the SUD Facility project with the funding criteria and priorities of the Virginia Opioid Abatement Authority and strategically utilizing available funds, the project can significantly enhance its impact on combating the opioid epidemic in Virginia. Comprehensive planning, stakeholder collaboration, and targeted funding applications will help ensure the project's success.

No single entity receives more than $14 million a year in unrestricted funds. As a result, the new SUD facilities cannot be easily fully funded using the Opioid Settlement Fund. Various soft costs like initial design, final design, furniture, inspections or similar services could potentially access some of the funds In order to only use Opioid Settlement Funds for the entire project costs, this would require:

1. The collaboration of many agencies, cities, counties and the Opioid Authority Agency to dedicate their portion of the Opioid Settlement Funds to the project,
2. Issuance of bonds paid back by the Opioid Settlement Funds, the structure of which would likely require legislation, or
3. Legislation requiring reallocation of the Opioid Settlement Funds off the top and keeping the percent of funds disbursed as is current; that is reducing the disbursement and allocation of funds from $1.1 billion to $826 million and the remaining $274 million for the development of the new SUD facility.

The following is a summary of the current funding values for Virginia Opioid fund.

Virginia Expected Opioid Settlement Funds			
(As of May 30,2024)			Disbursement Period in Years
$1,100,000,000.00			15
State Agencies	15%	$ 165,000,000.00	$ 11,000,000.00
Cities & Counties	30%	$ 330,000,000.00	$ 22,000,000.00
Opioid Abatement Authority	55%	$ 605,000,000.00	$ 40,333,333.33
		$1,100,000,000.00	$ 73,333,333.33
Opioid Abatement Authority Disbursements		Total	Totals / Year
Cities & Counties	15%	$ 90,750,000.00	$ 6,050,000.00
City -County Partnerships	35%	$ 211,750,000.00	$ 14,116,666.67
State Agencies	15%	$ 90,750,000.00	$ 6,050,000.00
Unrestricted	35%	$ 211,750,000.00	$ 14,116,666.67
		$ 605,000,000.00	$ 40,333,333.33
*Assumed average payout period, value available per year will vary.			

Existing Facilities Assessment

To determine if any of the existing buildings could be repurposed to support the new SUD buildings an assessment of the buildings and facilities on the Catawba Hospital campus was conducted. Upon review it was determined that only the dining hall should be used for the new SUD programs. An assessment of all the buildings is provided in Appendix D.

The Catawba campus infrastructure, such as the central plant utilities (power, water treatment and wastewater treatment) will require some upgrades and expansion to provide for any increased demand required for new structures. With that noted, there appears to be no obvious obstacles to providing any additional buildings necessary on the campus.

Physical Description and Environmental Considerations

The design of a modern, state-of-the-art state substance use disorder treatment facility is a careful balance between budget, appearance, internal environment, amenity, safety, security, staffing, operational and maintenance efficiencies. By properly addressing the above, and using well-trained and capable staff, it can be expected that the facility will contain all the elements necessary for successful treatment outcomes, staff attraction and retention, enhanced performance, and safety and security for patients, staff, and the community.

The program and conceptual facility layouts provided in this document are just the basic outline that begins to describe how this facility can fulfill the above-stated objectives. It is in the execution of the detailed design that these critical factors come together to create a whole that is greater than the sum of its parts. A design team experienced in this specific facility type is essential to the project's success.

Exterior Objectives

Catawba Hospital is an important member of the local and state community, and the architecture of the new SUD facility should complement the existing hospital. It should be complementary to the local architectural context and embody a non- imposing, non-threatening residential character. The hospital is a place of healing and personal discovery and should inspire those who reside and work there. At the same time, it must be designed and built in a manner that is cost-effective and provides ease of maintenance. Thus, it is important that every effort be made to explore appropriate design and building solutions that respect and respond to both criteria.

The final site plan should include outdoor recreation and related areas, especially gardens, walking and running paths. Efforts should be made to provide appropriate screening of patients in these areas from the public view and to minimize the opportunity for contraband finding its way into the facility.

Interior Objectives

The major design focus for the project should be applied to the interior patient and staff areas of the facility. For a truly effective treatment and rehabilitative environment, special attention must be paid to designing for an abundance of natural light, views to the outdoors (sky, gardens, courtyards, sculpture gardens, etc.), use of color and pattern, spatial variety, formal and informal spaces for programming and socializing, way finding, and transparency. Small, enclosed, and claustrophobic spaces; narrow, dead-end corridors must be avoided. All these considerations will benefit the well-being and behavior of both patients and staff alike, contributing to a safer operation, enhanced human performance, and more effective treatment. The design will also incorporate trauma-informed strategies to support psychological and emotional needs, ensuring spaces are safe and minimize potential triggers. Integration of technology, such as smart building systems, will also enhance both care and operational efficiency.

Overall, a purely institutional character should be minimized while focus on more normative, residential-style qualities should be heightened. The term “normative” refers to the experience that users would have in the “real world.” Living units should feel home-like. Program, education, and vocational areas should feel school-like, while the treatment malls should emulate a town center feel. In creating a variety of familiar experiences throughout the facility, as well as comfortable, familiar individual spaces, a stimulating daily journey can be achieved to help normalize the experience of patients, therefore enhancing their response to treatment. This approach will also prioritize employee satisfaction and workplace well-being, creating environments that promote staff well-being through natural light, ergonomic workstations, and relaxation areas. Accessibility and inclusivity, including universal design and considerations for neurodiversity, will ensure that the facility is welcoming and navigable for all. Incorporating public areas and art will enhance community engagement and provide a cultural connection, further enriching the environment. In turn, this same approach creates a much more treatment-amenable, comfortable, and safe working environment for staff.

Best Clinical Practices

- Individualized Treatment Plans
- Multidisciplinary Treatment Team
- Group and Individual Services
- Use of Evidence-based Practices
- Ongoing Assessments (Feedback Informed Treatment)
- Medication Assisted Treatment
- Variable Length of Stay Based on Clinical Milestones
- Patients Move Through Levels of Care Based on Clinical Needs and Progress in Treatment

Operations

The operational aspects of the transformed Catawba campus will include greater staffing efficiency, ease of movement, durability, minimal maintenance, and safety and security.. The single most expensive aspect of operating a facility of this type and size is staffing.
After the initial capital cost of construction and outfitting, the cost of staffing is an ongoing expense that far outweighs any other cost. Therefore, the facility must be planned and designed to be operated efficiently with the staff necessary to meet required treatment, service, maintenance, safety, and security needs.

Clear circulation, unobstructed lines of sight, easy monitoring of patient activities and movement help minimize the number of staff required to maintain a safe and secure facility. Other factors to consider are a practical layout for living units and functional spaces for patients, as well as a durable facility that needs minimal maintenance. A more effective design will reduce the need for additional staff to operate the facility, leading to significant cost savings over its lifespan.

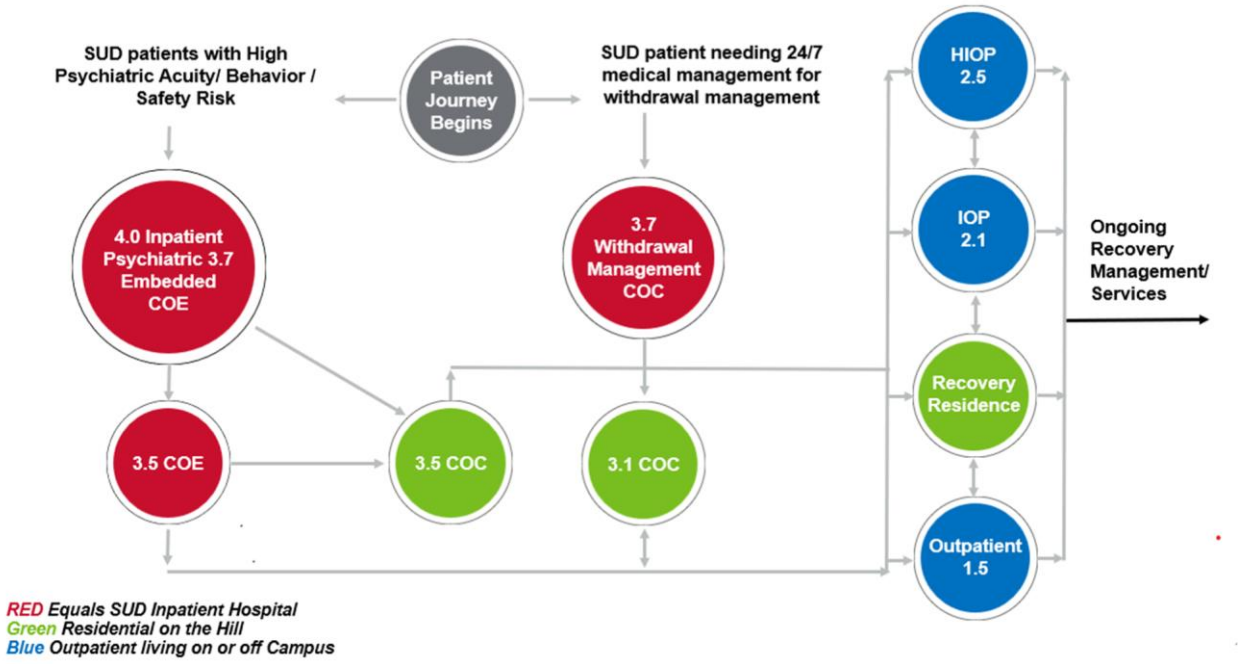
During the detailed planning and design of the facility, it is imperative to focus on how people move through and use the facility's many departments not just the building, finish materials and furnishings. With careful consideration and response, this project can be designed to require a minimal number of auxiliary staff resulting in considerable saving to ongoing staffing costs. Sound planning and design will also require less security staff to maintain safety in the day-to-day operations of the facility.

In the end, the facility is there to support the treatment mission in the most effective manner possible. It is a vehicle for the delivery of these services but must also allow all the staff to deliver their respective services safely and efficiently. A well-designed facility can accomplish these goals while enhancing patients' treatment and staff performance.

Facility Flexibility

Patients struggling with substance use disorders have complex needs, and most have co-occurring issues that need to be served in the level of care that is most appropriate for their presenting symptomology. The right treatment (level of care) at the right dose (length of time/time/number of services) is the optimal goal. Having a full, flexible continuum allows the patient to be placed where they need to be clinically, not where there happens to be an open bed or space for them. From there, the patient moves to the next, less intensive level of care that provides the right "dose" of care for their needs. Patients move both "up" and "down" in levels of care, as needed. Most patients will "step down" from more intensive to less intensive services over time. However, there are occasions where patients need to "step up" to restabilize before moving back "down" in levels of care.

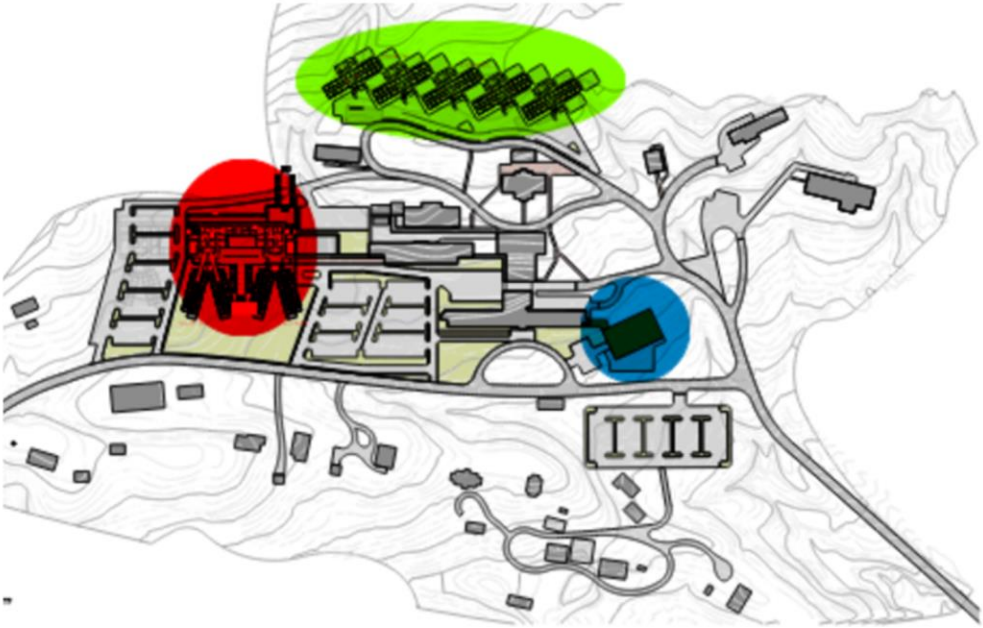
Flow Chart for Bed Type by ASAM Level of Care



The new SUD facility on the Catawba Hospital Campus will offer a full continuum of substance use disorder services, built in a flexible configuration to ensure the ability to serve a population that is in dire need of integrated SUD programming. Currently, there are gaps in the needed SUD services in the Catawba area, especially with residential beds that are able to care for and serve the needs of patients with a more complex clinical presentation. Many of these patients have co-occurring psychiatric, medical, and behavioral issues that make them more acute and complicated to treat. Historically, these patients have been treated in either a hospital or psychiatric setting (at times sending them out of the state due to the low number of beds available to meet this need). While this approach does keep these patients safe, once the patient is stabilized and no longer considered "acute," there are few options to move them into a specialized treatment modality that is needed to start the process of moving the patient from addiction to recovery. Absent this move to specialized care, the patient tends to rotate in and out of these acute settings, at a high cost and low long-term outcomes. The added beds of the SUD facility will add critical options for these complex patients that need high-intensity, 24/7 medically managed care that integrates SUD care and leads to coordinated transitions to lower intensity services over time. This model has been shown to have lower costs and improved outcomes.

Bed Type Location

The new units on the Catawba Hospital campus will be designed in such a way that there is great flexibility to address the fluctuations that occur in the needs of this population. For example, withdrawal management beds can also be used as observation beds; other beds in this



RED Equals SUD Inpatient Hospital
Green Residential on the Hill
Blue Outpatient living on or Off Campus

area can be used for co-occurring enhanced services from 4.0 through 3.5 levels of care for

those needing wrap around “on unit” services. The residential “Hillside” buildings can be used for either long term (3.1), short term (3.5) residential OR as a non-licensed recovery residence that allows patients to continue in an outpatient setting (2.5, 2.1, 1.5) while having room and board in a supportive setting. In this way, bed utilization is maximized in an efficient and safe manner.

Circulation

Simple and well-monitored circulation is an important planning consideration for any substance use disorder facility. Safety, security, rapid emergency response, facility evacuation and navigation throughout the facility all depend on clear and simple circulation.

Ample corridor width is also important to allow for ease of movement and enhanced monitoring. The main circulation corridors of the new SUD Inpatient building, as currently envisioned, will consist of a primary corridor connecting the new bed units, SUD focused treatment mall and connected Detox units. These circulation corridors will connect to the existing building 17 treatment mall and Dining Building 16. The new SUD inpatient building will have a new lobby central control in all options A, B and C. The back-of-house support areas remain in current locations on all options. The other corridor leads from one living community to the other. Secondary circulation is provided to allow ease of movement within each living community and between living units, programs spaces, support areas and the primary circulation corridors.

Each living community will have its own dedicated, simple corridor system that contains secondary security observation posts for monitoring patient movement within each community. Access to the actual living units will be controlled in all cases, with control doors at all unit entries.

Tertiary circulation is provided to allow for movement of staff and goods through the facility at large. All tertiary corridors would be considered staff-only, except in cases where “privileged” patients may assume support roles within the facility. This is purely an operational consideration, but the strategic placement of control doors and sally ports will allow for any combination of access according to programmatic and operational preferences.

Efficient circulation is all about navigating effectively. This will be accomplished and enhanced primarily by how the circulation paths are designed using landmarks and visual locational cues along the journey. Clear signage and color-coding applied in a variety of ways will facilitate navigation.

In the detailed planning and design of the facility, every effort should be made to avoid dead-end corridors or long corridors with just a door at one end. Attention to these areas of circulation is important in providing an appropriately therapeutic environment where patients (especially those on psychotropic medications suffering from SUD dual diagnosis) are not disturbed by the appearance of being “trapped” at the end of a long tunnel-like corridor. This is also an important factor in navigation.

Security and Security Zoning

The overall security strategy for the revamped Catawba Campus is similar to that of other projects of this nature. The perimeter of the facility would need to be fully controlled using a medium-level security fence line and vehicular/pedestrian sally ports. The internal security in a modern psychiatric facility catering to patients of varying acuity levels and types of commitment is specifically responsive to the requirements for each sector of the population within the facility's two patient residential communities, Acute Behavioral and Residential / Transitional.

Our philosophy regarding psychiatric facility security is two-fold; first,, the design and layout of the physical facility and second, the use of electronic systems. The physical relies on lines of sight, wall construction, etc., and accounts for the first line of safe and secure operations. The electronic systems (locking/control mechanisms, CCTV, duress alarms, etc.) provide a secondary means of supporting the security needs at the facility. A well-planned facility will have clear, un- obstructed lines of sight throughout and the ability to minimize staffing by providing easy monitoring of patient activities and movement.

In a modern psychiatric facility, and to the extent allowable for the intended mode of operations, our belief is "maximum security outside, maximum freedom inside." This approach allows for the most "normative" living environment possible for the patients, providing physical and electronic controls as required to maintain the acceptable degree of safety and security for staff, patients, and the community.

As stated above, well-informed, intelligent planning by a designer experienced in this building type is one of the most critical elements in creating a safe and secure facility. It is imperative that staff have the ability to visually monitor patient activities and all movement throughout the facility. This factor should apply not only to areas designated for daily patient use, but also in areas designated as "staff-only."

All areas of the facility and its two communities (SUD Inpatient Hospital and SUD Residential / Transitions) will offer varying degrees of access and movement for both patients and staff using a combination of control doors placed strategically throughout the facility. Efforts will be made to ensure that anyone traversing through the facility can do so in an expeditious yet controlled manner. It is anticipated that a card-/chip-banded access system will be used for both staff and patients to allow complete control over who goes where while at the same time allowing security staff to monitor and log this movement using their control system.

A staff duress system, with transmitters carried on-person will allow security to immediately locate and respond to emergency situations that may arise anywhere within the facility.

A key security feature of the Catawba Hospital campus is its expansive 700-acre location nestled in the Virginia mountains. Situated on a mountainside and bordered by the Jefferson National Forest and vast natural landscapes, the campus lies within a 100-square-mile district with just 550 residents. Once the site of the Roanoke Red Sulphur Springs Resort, this area is the safest and most picturesque land in the Commonwealth's asses portfolio, ideal for development and purposeful use.

Departmental Narratives

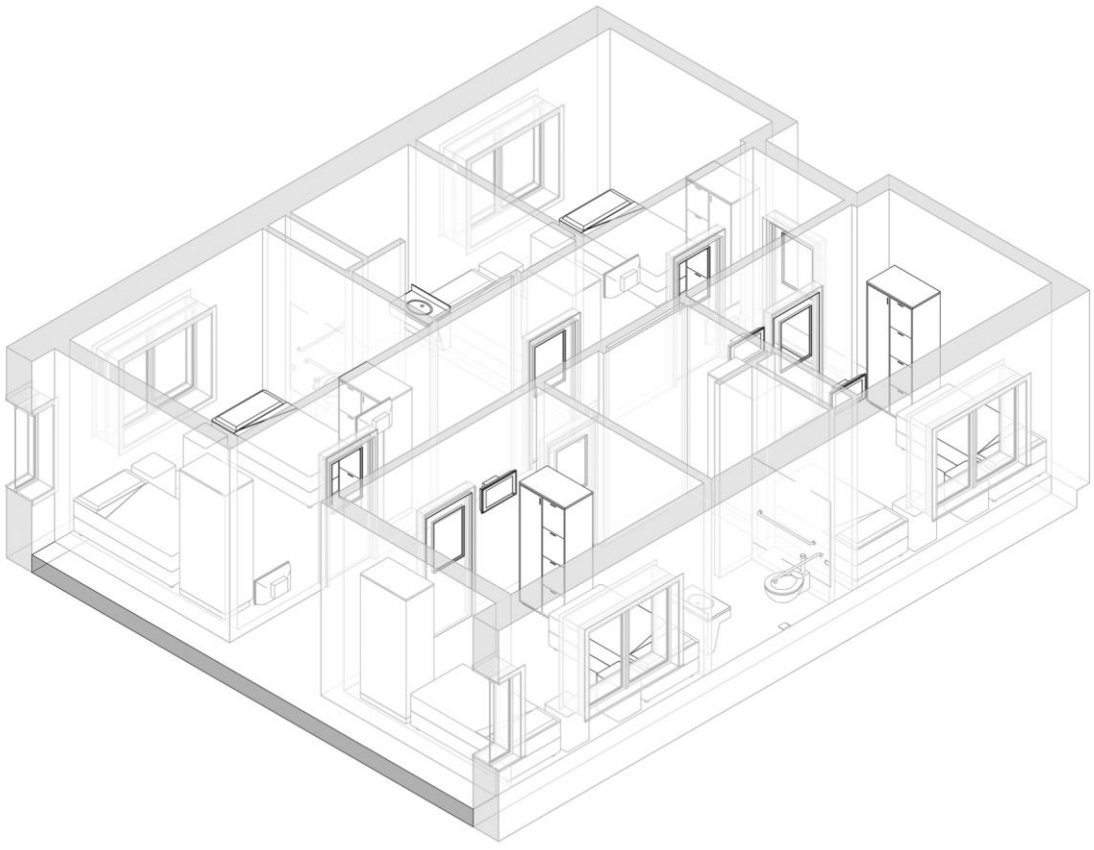
Living Units

The new SUD inpatient Hospital units have been programmed to provide nearly identical floor plates for ease of use among all staff members who may migrate from one unit to another. This familiarity helps to enhance delivery of services, efficiency of operations, safety, and security.

Each living unit has a separate, staff-only service and access corridor. This gives the staff a safe “back-of-house” zone from which they can enter and exit the unit without direct contact with patients if needed. This zone also allows service personnel to access the unit for a variety of maintenance, security, and service needs without introducing them to the patient population and potentially disrupting daily on-unit activities.

Due to the dual populations the hospital must serve, two living unit concepts are employed; one for SUD inpatient Hospital and another for SUD Residential Transitional patients. Every unit is planned with an activity zone, sleeping zone, support services zone and a nursing center.

Living Unit – Residential Transitional Patient Room



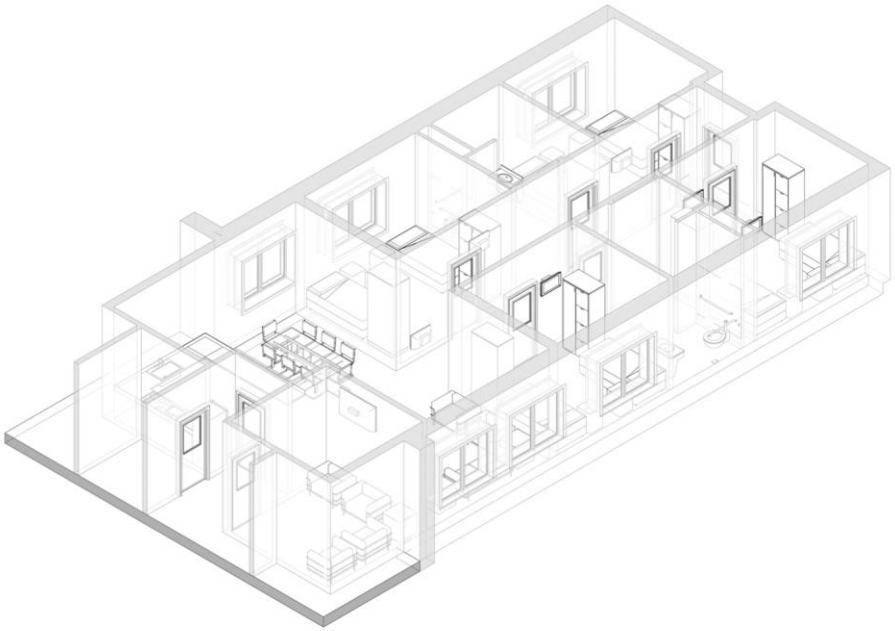
Each living unit has a variety of dedicated spaces to support the patient population and offers a variety of daily activities. Spaces include quiet and active program rooms, comfort room, group room, exam/physical survey room, enclosed outdoor patio, consultation room, and seclusion rooms. This level of variety promotes variation in daily patient activities and enhanced operational flexibility as the facilitation of services and treatment may change over time.

Toilets and showers are also centrally located off the unit core to allow staff maximum observation and management of their use. In addition to the centrally located toilet facilities, the patients will have specially designed ensuite toilet facilities that can be managed by staff, as necessary. The residential transitional SUD patients will not have ensuite toilet facilities in the current layout but will have two shower/ toilet rooms for each 8-bed unit. Other program spaces within the unit (including the above) are traditionally included in psychiatric nursing units as required by current planning standards.

Special focus during design should be placed on the provision of non-institutional, residential “feel” finishes and furnishings. Use of carpet or carpet tile where possible is recommended. Acoustics are extremely important in creating a calm and treatment-amenable environment. Abundant light and views are also required to help provide a normative environment.

Each living unit will have both active and passive zones and access to an outdoor recreation area. Where living units are on the second floor, a stairway to the outdoor recreation area, fully glazed to maximize observation of patient movement, should be provided. The units will have electronically and manually operable doors and sleeping rooms located away from the activity zone.

Living Unit – Residential Housing Unit



Programs

Admissions

The admissions program, designed for receiving and processing new patients, will be situated in the new SUD facility. This arrangement applies to Options A, B, and C, al of which involve locating the admission program within this building. The new admissions unit will be as comfortable as possible in finish and furnishings balanced with the need for enhanced durability and security. The admissions process is traditionally one in which patients feel at their most vulnerable and on edge. A soothing environment will help to calm patients and consequently create a safer, more expedient admissions process.

Program Staff

This department would be located near the new SUD facility building beds and would include all program staff (SUD treatment specialists, psychologists, therapists, social workers, and support staff). They would access their space by going through the lobby and security in all options. They would go directly to their office areas and to the core of the facility to serve their treatment mission. The environment should be professional and like a typical office in appearance. There should be abundant daylight via windows and/or skylights to create the healthiest and most productive work environment.

Patient Dining (Provided in Existing Building 16)

The existing dining rooms will serve the new SUD facility building population and SUD Residential transitional population located within their separate building in the new complex. The existing dining rooms are not sized for all patients to be able to dine off the unit as on-unit dining will also be provided. Both populations need to have the flexibility to dine on-unit based on level of acuity. Each housing unit will have a small food break out area. The existing dining room is located well for both populations and is adjacent to the food service kitchen for ease and efficiency of service. The location takes advantage of exterior access views and has large windows overlooking the outdoors.

Treatment Mall

The treatment mall for SUD patients will be located in the SUD inpatient Hospital. The treatment mall is the figurative “town squares” of the facility and contain all programs available to the patients, including treatment, education, vocation, and amenities such as a library, computer rooms, recreation, and other service and support components. These areas are an important part of a patient’s daily journey and should reinforce a positive and desirable routine. They should be designed in a way that emulates a public mall or “main street,” with storefronts, signage, colors, and materials that normalize the environment to allow patients to be more open to treatment and other activities. In addition, similar areas will be provided in each SUD residential building but be smaller in size and each area will be used for multiple functions.

Since this is a highly structured living situation, accommodation should be made wherever possible for informal seating and meeting places to encourage unscheduled conversation and activities between patients or patients and staff. This approach will help in making positive

interaction and thus communication between and among all users a natural and desirable feature of the design.

Education
The education components of each treatment mall consist of classrooms, arts and crafts, computer rooms, library, and support spaces. These areas should be designed with abundant light and large windows to the mall for easy observation and with good acoustics in mind. The glass may be fritted (up to approximately 4- to 5-feet high) to prevent distraction to the patients from passers-by. This area should emulate a high school or junior college classroom environment.

Vocational Services
Vocational Services will be designed to be provided in the SUD inpatient hospital. This suite is composed of labs and classrooms, a computer lab, and areas for car wash, horticulture (including the existing greenhouse), housekeeping, and instruction and support areas. To gain entry to this suite, patients with the appropriate acuity must pass through a security portal to prevent patients from obtaining contraband from the workshops.

Associated with this project component could be a donated clothing store that could take in lightly used items and these could be repaired and cleaned as needed, and offered for free or at a minimal cost to patients who need them. It can best be equated to a thrift shop for the patients.

As with the education components, they should be designed with abundant light, large windows to the mall for easy observation and with good acoustics in mind. This department should also emulate a high school or junior college classroom environment.

Recreation Services
SUD Residential patients and SUD Inpatient Hospital communities will have nearly identical amenities in this area, including sharing a new gymnasium located in the SUD Inpatient Hospital, physical therapy, and weight rooms. The new gym will be similar to the current gym which has natural light, the positioning of clerestory windows prevent glare on the floor.

Shared Patient Services
This series of program support components are of a variety that the designer can be quite creative in how the support components appear. These components form the heart of the treatment mall, and are much like the center of town, with multiple store fronts. Each community's mall includes:

- Group therapy rooms
- Multi-denominational worship room
- Barber/beautician
- Game room
- Independent living skills lab
- Music therapy rooms
- Meditation rooms
- Exam and physical survey rooms

As with all other “public” areas of the communities, transparency for ease of patient monitoring is of great importance, as is the creation of as normative environment as possible. If possible, centralized gardens (or “parks”) should be located directly off the malls so that patients can walk freely from inside. This feature will also introduce views and light into the mall. Other considerations for the malls are park-like benches and informal seating areas and a wider area in the center of this most active part of the mall.

Support
The support areas of the hospital and residential units consist of both administrative and service areas where each should be designed according to use and with a modern professional design aesthetic. Administrative leadership for all new SUD services will be located in the outpatient building.

Public Lobby
The new SUD Inpatient Hospital will have a new main lobby. This area should be designed to a standard as would be the case in any new community hospital. The environment should be bright, pleasant, and welcoming. Warm materials, color palettes, and furnishings should set the tone for a safe and calm place of arrival. Video information kiosks and other modern amenities to assist in dissemination of information and way finding are desirable. The reception station should be front and center and have a good line of sight throughout the lobby, including the screening area and public toilet entries.

Executive Administration, Human Resources and Staff Development

All of these are traditional administrative office areas that have been collocated to maximize efficiency by sharing support functions such as restrooms, work and copy rooms, storage, housekeeping, and other needs.

Special attention to a modern and pleasant working environment is important, as is abundant daylight with windows where possible and skylights or monitors where necessary. If possible, internal office areas should have clerestories and/or glazed transoms over doors to allow as much daylight as possible from adjacent areas. These areas will be located in the outpatient building for the substance use disorder program only.

Kitchen

The existing kitchen will provide space to receive and store ingredients, prepare, cook, and distribute meals to the patients as necessary based upon the particular needs of the patients and of the units. Each unit will house an area to distribute food once delivered to the unit. Each 8-bed housing SUD residential housing unit will have one residential kitchen and dining area to promote life skills and success after discharge. There are currently two units planned per floor for a total of 16 beds.

Housekeeping

This component is strictly utilitarian in design and layout and remains in its current location adjacent to the maintenance/materials management department and loading dock. It may also

be used for vocational training of privileged patients.

Maintenance/Material Management

This component is also strictly utilitarian in design and layout and remains in its current location adjacent to housekeeping and the loading dock. It may also be used for vocational training of privileged patients.

Energy Plant

A small energy plant would be built directly adjacent to the SUD Inpatient Hospital building and the Outpatient Building. This would be contiguous with the rest of the building to minimize construction cost. It should be secure from access to any patients.

Medical and Dental

A small medical and dental clinic area would be located in the new SUD Inpatient building for all options.

Pharmacy

A small new separate pharmacy will be provided for all options. It will be adjacent to the treatment mall in the SUD Inpatient Hospital, but on the 1st floor and will provide both SUD outpatient and SUD Inpatient support.

Facility Modeling, Functional and Space Programming

The initial programming resulting from data analysis indicates the additional space is needed and must address:

1. Detoxification for medically stable patients,
2. Inpatient facilities to treat those with both SUD and behavioral health disorders,
3. Biotechnological facilities for the advanced assessment and treatment of patients,
4. Satellite nursing workforce training and development facility -- Workforce development for practitioners, nurses, and SUD and behavioral health technologists in the SUD health continuum of care continues to be a critical need. The Catawba SUD project would provide square footage for a satellite campus of a nursing school for one of the local universities to provide on-site nursing education and clinical experience on the campus with the new proposed programs. This square footage would be provided in one of the new outpatient buildings, potentially a floor of the outpatient building. Long-term planning considerations would allow the growth of this program on the campus to a full-scale behavioral health nursing school.
5. The three options are planned to provide between 64 and 128 SUD residential treatment beds. Not to be confused with “hospital” beds; the residential treatment bed would be similar to those found in college dormitories. A major problem in treating SUD is the inability to continue treatment after detoxification is complete, but before the patient is ready to return home; the result is multiple readmissions. In effect, the residential treatment is the necessary stabilization point in a supportive treatment setting that sets the stage for a successful return to home, family, and work that the Commonwealth desires the SUD facility to provide.

The three options have been scheduled, planned, and cost estimated as part of this report.

Space Programming

To develop the program for the transformed hospital campus, collected data and combined with best practices and developed into space requirements. On the next page is the summary of the square footage derived from the space programming effort. Due to time constraints no meetings with departments took place. HDR used our team's experience in designing SUD and behavioral health facilities, referencing the current standards and guidelines listed in the concept narratives to create the program. The full space program is included in Appendix F.

Option A - Mini-Continuum of Care Model

	Option A - Mini-Continuum of Care Model					New Construction
Space Program Summary						
Program	**NSF**	**Grossing Factor**	**DGSF**	**Square Feet per Bed**	**Comments**	**DGSF**
SUD Residential Housing						
RH Unit 1- Level 1 and Level 2 -(4-8 Bed Units)	14,870	1.40	20,818	651	16 beds per Floor - 32 Per Building, 3.1, 3.5 COC or RR	**20,818**
RH Unit 2- Level 1 and Level 2 -(4-8 Bed Units)	14,870	1.40	20,818	651	16 beds per Floor - 32 Per Building, 3.1, 3.5 COC or RR	**20,818**
RH Unit 3- Level 1 and Level 2 -(4-8 Bed Units)	14,870	1.40	20,818	651	16 beds per Floor - 32 Per Building, 3.1, 3.5 COC or RR	**20,818**
	44,610		**62,454**		**96 beds**	**62,454**
SUD Inpatient Hospital						
SUD Unit 1 (24 Beds)	11,297	1.60	18,075	565	2 -12 bed units (24) - 4.0 or 3.5 COE	**18,075**
SUD Unit 2 (24 Beds)	11,297	1.60	18,075	565	2 -12 bed units (24) - 4.0 or 3.5 COE	**18,075**
SUD Unit 3 (16 Beds) - Medical / Detox	10,877	1.60	17,403	544	1 - 16 bed units - 3.7 COE	**17,403**
SUD Unit 3 (16 Beds) - Medical / Detox (Shell)	10,877	1.60	17,403	544	Future - 1 - 16 bed units 3.7 COE	**17,403**
SUD Treatment Mall & Support	11,530	1.60	18,448			**18,448**
	55,878		**89,405**		**64 beds**	**89,405**
Detox						
Detox Unit - Level 1	16,065	1.40	22,491	1,406	1 16 bed unit - 3.7 COC	**22,491**
Detox Unit - Level 2 (Shell)	16,065	1.40	22,491	1,406	1 16 Future -bed unit - 3.7 COC	**22,491**
	32,130		**44,982**		**16 beds**	**44,982**
SUD Inpatient Hospital Total	**88,008**		**134,387**			**134,387**
SUD Outpatient Education and Research Building						
Main Lobby	720	1.40	1,008			**1,008**
Outpatient Clinic	11,259	1.55	17,451			**17,451**
Education and Research	11,620	1.40	16,268			**16,268**
Administration	4,872	1.40	6,821		SUD Administration - Clinical Support Shared	**6,821**
Addiction - Clinical Support	7,466	1.40	10,452		SUD Administration Clinical Support Shared	**10,452**
	35,217		**52,001**			**52,001**
Total NSF						
Total DGSF						
Mechanical/Electrical (In Core Factor Above)						
Building Grossing (In Core Factor Above)						
Total Building Gross SF (BGSF)						**248,841**

Option B - Base Continuum of Care Model

	Option B - Base Continuum of Care Model				New Construction
Space Program Summary					
Program	**NSF**	**Grossing Factor**	**DGSF**	**Comments**	**DGSF**
SUD Residential Housing					
RH Unit 1- Level 1 and Level 2 -(4-8 Bed Units)	14,870	1.40	20,818	16 beds per Floor - 32 Per Building, 3.1, 3.5 COC or RR	**20,818**
RH Unit 2- Level 1 and Level 2 -(4-8 Bed Units)	14,870	1.40	20,818	16 beds per Floor - 32 Per Building, 3.1, 3.5 COC or RR	**20,818**
RH Unit 3- Level 1 and Level 2 -(4-8 Bed Units)	14,870	1.40	20,818	16 beds per Floor - 32 Per Building, 3.1, 3.5 COC or RR	**20,818**
RH Unit 4- Level 1 and Level 2 -(4-8 Bed Units)	14,870	1.40	20,818	16 beds per Floor - 32 Per Building, 3.1, 3.5 COC or RR	**20,818**
	59,480		**83,272**	**128 beds**	**83,272**
SUD Inpatient Hospital					
SUD Unit 1 (24 Beds)	11,297	1.60	18,075	2 -12 bed units (24)	**18,075**
SUD Unit 2 (24 Beds)	11,297	1.60	18,075	2 -12 bed units (24)	**18,075**
SUD Unit 2 (24 Beds)	11,297	1.60	18,075	2 -12 bed units (24)	**18,075**
SUD Unit 2 (24 Beds) - Shell	11,297	1.60	18,075	Future - 2 -12 bed units (24) - Shell	**18,075**
SUD Unit 3 (16 Beds) - Medical / Detox	10,877	1.60	17,403	1 - 16 bed units - 3.7 COE	**17,403**
SUD Unit 3 (16 Beds) - Medical / Detox	10,877	1.60	17,403	1 - 16 bed units - 3.7 COE	**17,403**
SUD Treatment Mall & Support	23,940	1.60	38,304		**38,304**
	90,882		**145,411**	**104 beds**	**145,411**
Detox					
Detox Unit - Level 1	16,065	1.40	22,491	1 16 bed unit - 3.7 COC	**22,491**
Detox Unit - Level 2	16,065	1.40	22,491	1 16 bed unit - 3.7 COC	**22,491**
	32,130		**44,982**	**32 beds**	**44,982**
SUD Inpatient Hospital Total	**123,012**		**190,393**		**190,393**
SUD Outpatient Education and Research Building					
Main Lobby	720	1.40	1,008		**1,008**
Outpatient Clinic	11,259	1.55	17,451		**17,451**
Education and Research	11,620	1.40	16,268		**16,268**
Administration	4,872	1.40	6,821	SUD Administration - Clinical Support Shared	**6,821**
Addiction - Clinical Support	7,466	1.40	10,452	SUD Administration Clinical Support Shared	**10,452**
	35,217		**52,001**		**52,001**
Total NSF					
Total DGSF					
Mechanical/Electrical (In Core Factor Above)					
Building Grossing (In Core Factor Above)					
Total Building Gross SF (BGSF)					**325,666**

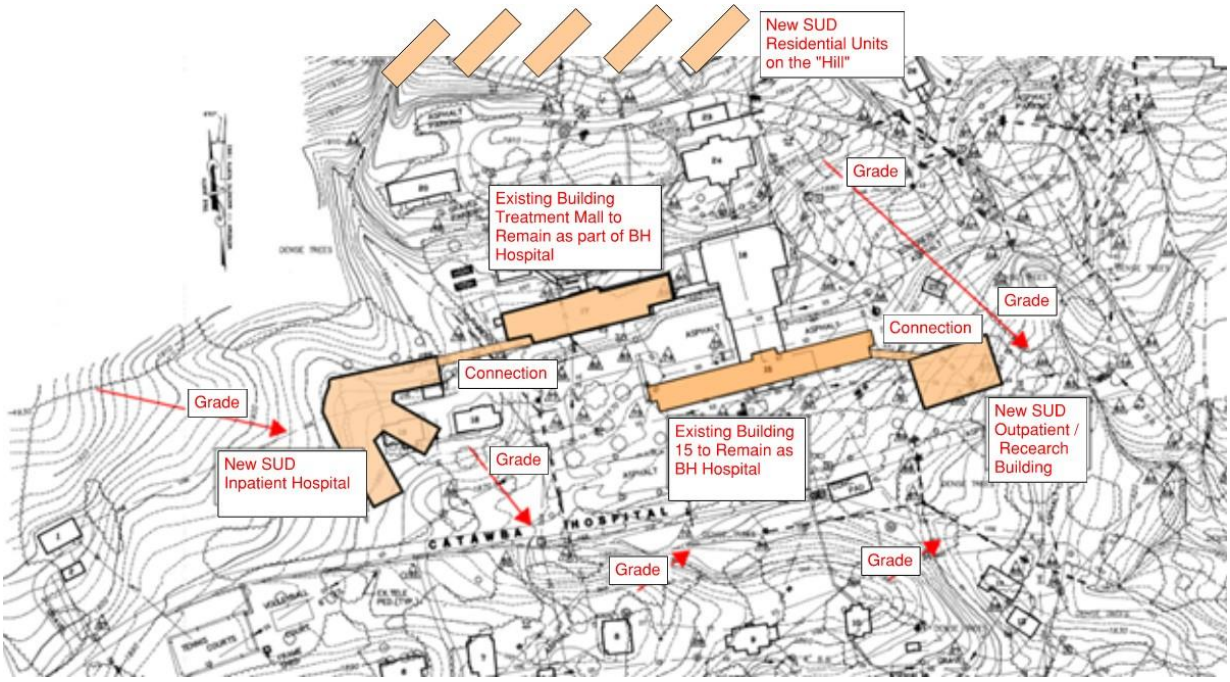
Option C - Enhanced Continuum of Care Model

	Option C - Enhanced Continuum of Care Model					New Construction
Space Program Summary						
Program	**NSF**	**Grossing Factor**	**DGSF**	**Comments**		**DGSF**
SUD Residential Housing						
RH Unit 1- Level 1 and Level 2 -(4-8 Bed Units)	14,870	1.40	20,818	16 beds per Floor - 32 Per Building, 3.1, 3.5 COC or RR		**20,818**
RH Unit 2- Level 1 and Level 2 -(4-8 Bed Units)	14,870	1.40	20,818	16 beds per Floor - 32 Per Building, 3.1, 3.5 COC or RR		**20,818**
RH Unit 3- Level 1 and Level 2 -(4-8 Bed Units)	14,870	1.40	20,818	16 beds per Floor - 32 Per Building, 3.1, 3.5 COC or RR		**20,818**
RH Unit 3- Level 1 and Level 2 -(4-8 Bed Units)	14,870	1.40	20,818	16 beds per Floor - 32 Per Building, 3.1, 3.5 COC or RR		**20,818**
RH Unit 3- Level 1 and Level 2 -(4-8 Bed Units)	14,870	1.40	20,818	16 beds per Floor - 32 Per Building, 3.1, 3.5 COC or RR		**20,818**
	74,350		**104,090**	**128 beds**		**104,090**
SUD Inpatient Hospital						
SUD Unit 1 (24 Beds)	11,297	1.60	18,075	2 -12 bed units (24)		**18,075**
SUD Unit 2 (24 Beds)	11,297	1.60	18,075	2 -12 bed units (24)		**18,075**
SUD Unit 2 (24 Beds)	11,297	1.60	18,075	2 -12 bed units (24)		**18,075**
SUD Unit 2 (24 Beds)	11,297	1.60	18,075	2 -12 bed units (24)		**18,075**
SUD Unit 3 (16 Beds) - Medical / Detox	10,877	1.60	17,403	1 - 16 bed units - 3.7 COE		**17,403**
SUD Unit 3 (16 Beds) - Medical / Detox	10,877	1.60	17,403	1 - 16 bed units - 3.7 COE		**17,403**
SUD Treatment Mall & Support	23,940	1.60	38,304			**38,304**
	90,882		**145,411**	**104 beds**		**145,411**
Detox						
Detox Unit - Level 1	16,065	1.40	22,491	1 16 bed unit - 3.7 COC		**22,491**
Detox Unit - Level 2	16,065	1.40	22,491	1 16 bed unit - 3.7 COC		**22,491**
	32,130		**44,982**	**32 beds**		**44,982**
SUD Inpatient Hospital Total	**123,012**		**190,393**			**190,393**
SUD Outpatient Education and Research Building						
Main Lobby	720	1.40	1,008			**1,008**
Outpatient Clinic	11,259	1.55	17,451			**17,451**
Education and Research	11,620	1.40	16,268			**16,268**
Administration	4,872	1.40	6,821	SUD Administration - Clinical Support Shared		**6,821**
Addiction - Clinical Support	7,466	1.40	10,452	SUD Administration Clinical Support Shared		**10,452**
Shell Space Future Clinical	12845	1.40	17,983	SUD Administration Clinical Support Shared		**17,983**
	35,217		**69,984**			**69,984**
Total NSF						
Total DGSF						
Mechanical/Electrical (In Core Factor Above)						
Building Grossing (In Core Factor Above)						
Total Building Gross SF (BGSF)						**364,467**

Site Analysis

Several locations were explored during the pre-planning period. The overall footprint as developed was used to determine site space requirements. The area directly west of Building 17 was mostly open and sloped less than other areas. It was also large enough to house the footprint needed for the new SUD Inpatient Hospital. This building provides a direct connection to the treatment mall and is a direct path to Building 16, dining, so the location selected works well. To the east of Building 15 is also an open and sloped less than other areas and provided a direction connection to Building 15. The area is small, so the smaller footprint of the SUD outpatient building worked well for this location. The new SUD residential housing area will be located on the northern most point of the campus and behind Building 24. Other parameters evaluated included location of existing utilities, disturbance of natural resources, site grading cost, and demolition cost.

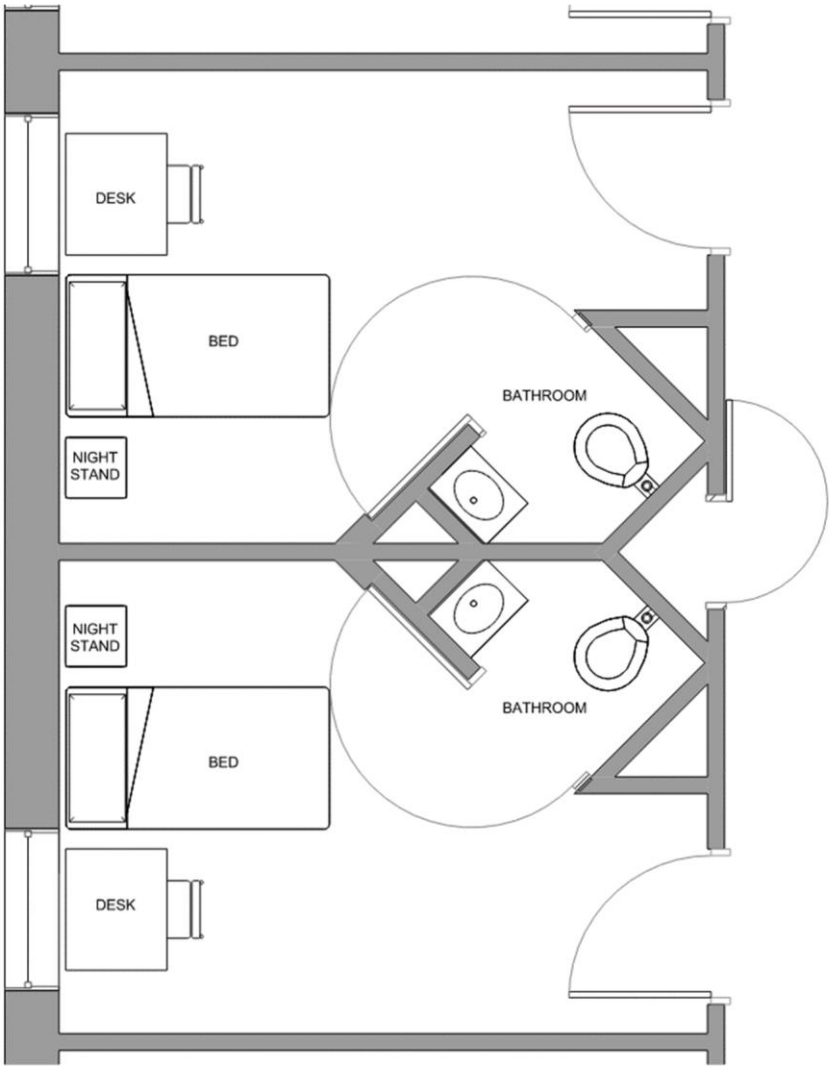
Site Diagram Overall



Concept Plan

The program and conceptual facility layout provided in this Study are just the basic “kit of parts” that describes how the facility can fulfill the previously stated objectives. It is in the execution of the detailed design that these critical factors come together to create a whole that is greater than the sum of its parts. A design team experienced in this specific facility type is essential to the project’s success.

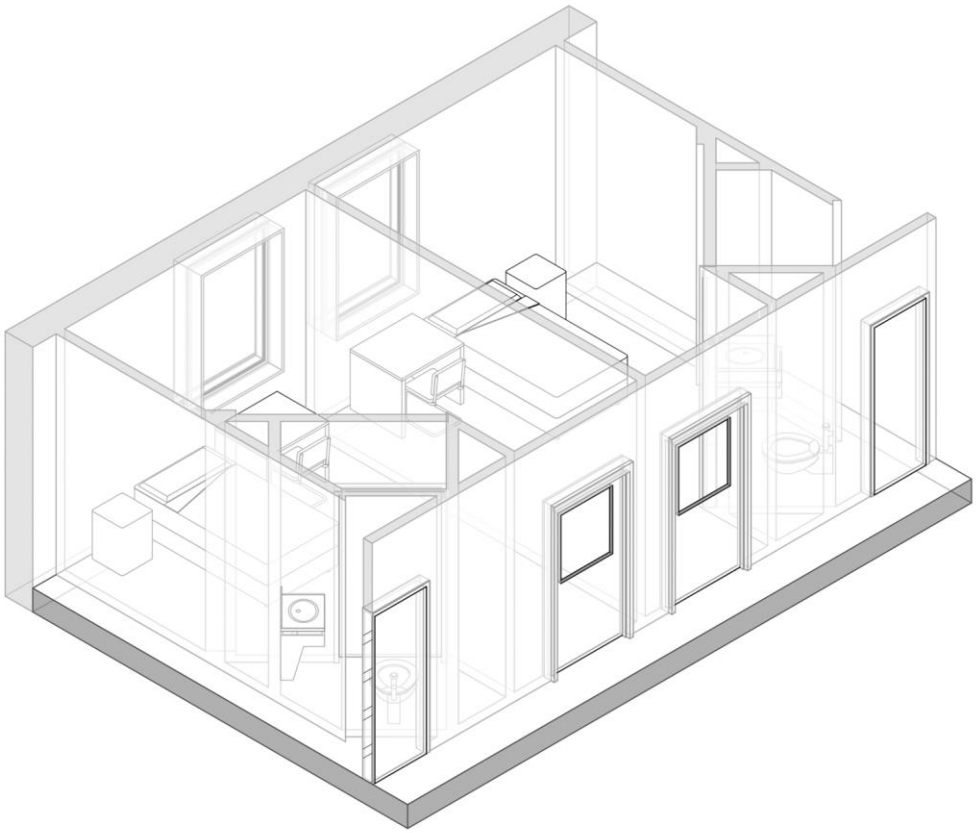
Typical SUD Inpatient Hospital Patient Rooms



As with most design challenges there are multiple solutions. Many factors must be considered when developing a concept for a new facility. Constraints such as budget, staffing, operational treatment model, and available sites are just some of the many issues to consider. The SUD Inpatient Hospital patient rooms would be in the new SUD Inpatient Hospital building and would

include ensuite toilet rooms where appropriate for the SUD's hospital's population. Accordingly, the Western State Hospital patient rooms are appropriate for the SUD Inpatient Hospital populations. The bedrooms with ensuite toilets will be approximately 150 net square feet in area for ADA and 130 net square feet for non-ADA. The SUD patient rooms in the SUD residential would be smaller in size with no ensuite toilet room and be designed for double occupancy. The SUD residential housing units are divided into 8-bed units which would share 2 full bathrooms with toilets and showers.

Typical SUD Inpatient Hospital Patient Rooms



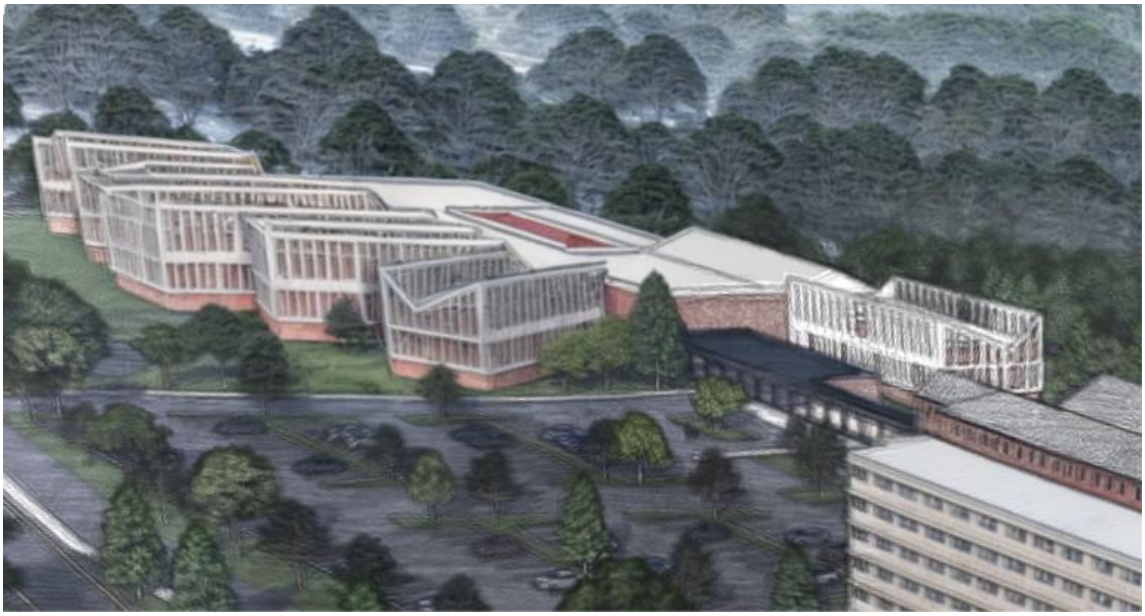
Living Units Pods

As discussed in the departmental narratives, two living unit concepts are used to accommodate the populations that are served. The diagrams below illustrate SUD Inpatient Hospital concept.

Concept Diagram Living Pod – SUD Inpatient Hospital

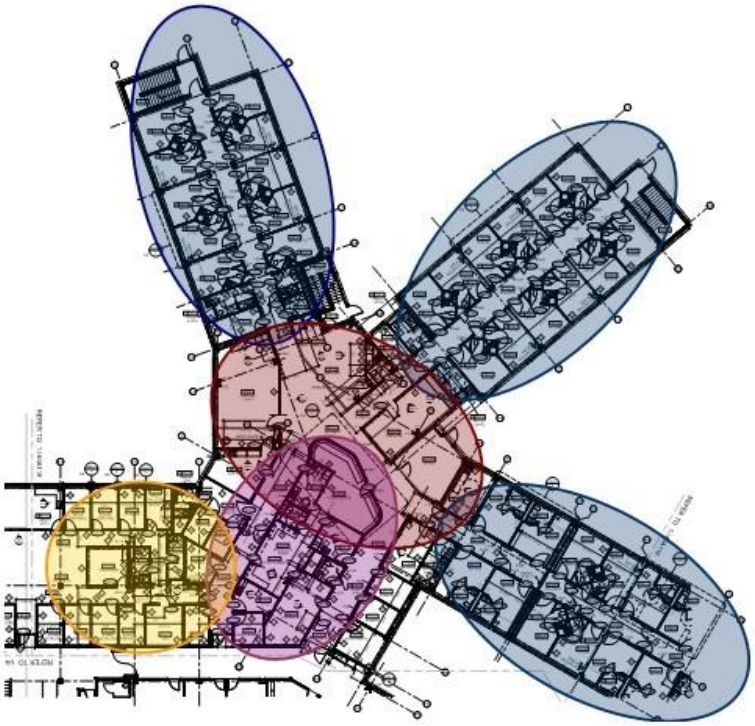
In a more detailed look, each living unit will have a separate, staff-only service and access corridor and a central day and/or dining core to maximize staff observation of patient activities and movement. The above diagram shows the relationship of the sleeping, activity, and support zones with the nursing node.

Rendering Living Pod – SUD Inpatient Hospital



The figure below shows how the Living Pod bubble diagram was translated into the Patient Care Units at Western State Hospital.

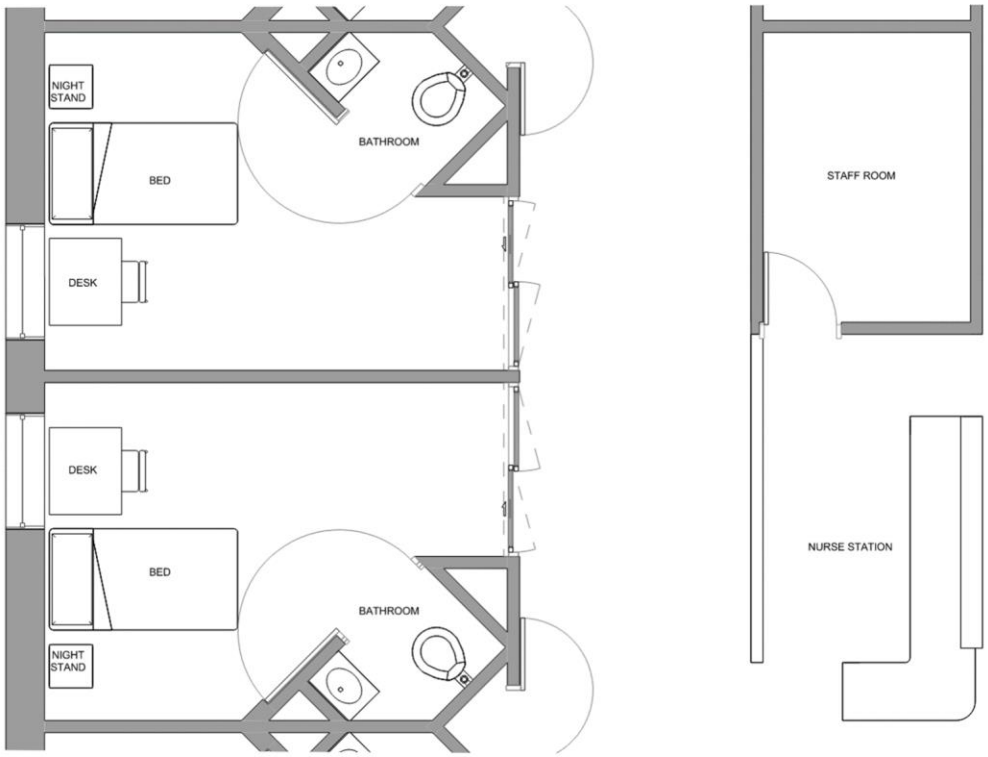
Western State Hospital (WSH) Living Unit



The SUD Inpatient Hospital living unit will have a separate, staff-only service and access corridor and a central day and/or dining core to maximize staff observation of patient activities and movement. However, the Adult SUD living unit places the sleeping zone farther from the nursing node and is not as intimate with the activity zone, all while providing patient "observable privacy." This relationship, as shown in the diagram on the following page, helps to create a more normative environment for patients.

The SUD Inpatient Hospital will have a dedicated detox and medical unit. This living unit will have a separate typical staff-only core corridor and a large open nurse station with direct observation of patient activities and movement. Below is part of the concept for these units.

Typical SUD Inpatient Hospital Detox / Medical Patient Rooms



Facility Zoning

The transformed campus will consist of four major zones: SUD Outpatient, Research and Education, SUD Inpatient Hospital and SUD Residential Housing, administrative and support. This zoning approach recognizes that two distinct security and treatment modalities will exist at the new facility. Using living unit concepts above, the following scaled planning blocks were developed:

Lobby / Front of House / Administration – Lobby, Security, Clinic, Executive Administration (Located in SUD Outpatient building) Human Resources and Staff Development

Support / Back of House – Housekeeping, Materials Management, Laundry, Kitchen, Maintenance, and Pharmacy

Central Energy Plant – Sized for Option C level expansion.

Admissions – One unit provided, existing in Option A and B and New in Option C.

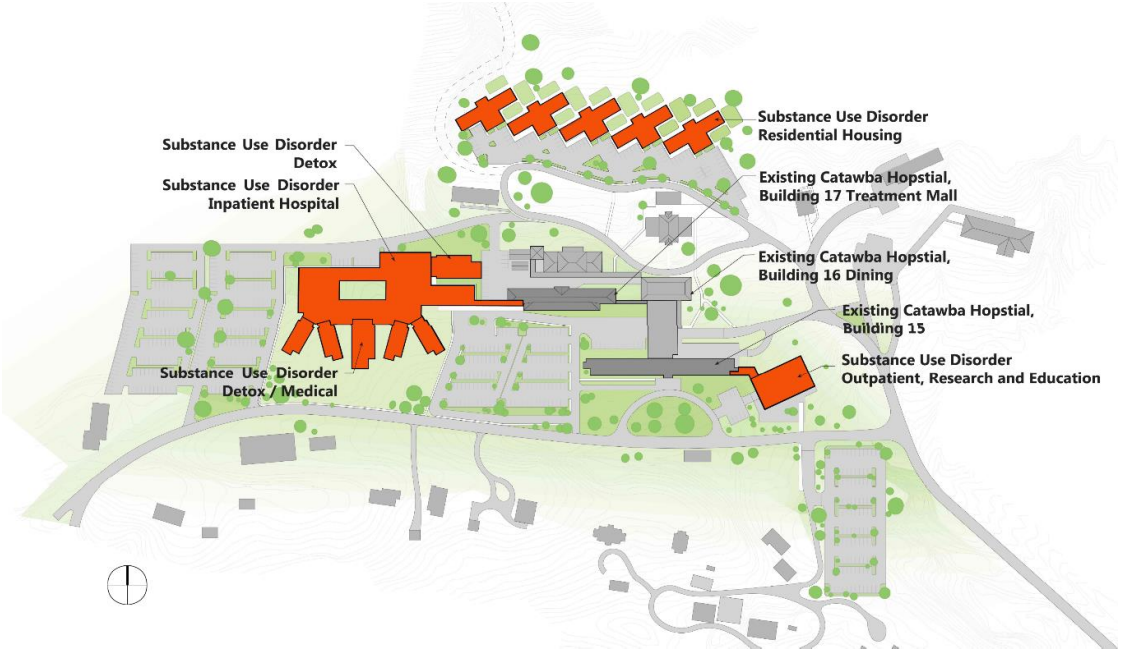
Living Units – 12– and 16 Bed Units for SUD Inpatient Hospital and 8 bed units for SUD Residential.

SUD Inpatient Hospital Treatment Mall -- Education, Vocation, Recreation, Shared Resident Services Program Staff, Visitation, Dining and Transportation

Facility Layout

Using the planning blocks and overlaying them on a same scaled topographical site plan, various layouts were explored. Based upon the concepts and principles noted throughout this study, the transformed campus layout is below.

CONCEPT SITE PLAN - OPTION C



This concept organizes the building components around Building 15, with strategic placement of expansion of the complex to the north, east and west portions of property. The public-oriented shared “core” elements are located to the south of the complex, facing the vehicular approaches from Catawba Hospital Drive. The expanded SUD Inpatient Hospital units are to the west of Building 17 and SUD residential housing are to the North. The “back of house” elements remain to the rear of Building 15 as they exist today. Parking is decentralized, with potential for dedicated lots for staff and visitors.

The building design optimizes daylight access, incorporates an efficient circulation system, and includes secure outdoor area. Public shared spaces are positioned to the southeast, while the “back of the house” shared elements are located to the north. The SUD housing units are situated to the west and north oft the SUD Outpatient building courtyard. This layout creates a parallel and interconnected circulation system with distinct separation between public and services areas, and clear zoning for housing security.

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SUD Outpatient Building, SUD Inpatient, SUD Residential Housing
surrounding Catawba Hospital looking Northeast - Option C

Concept Schematic Narratives

Existing Campus Overview

Nestled in the foothills of the Blue Ridge Mountains, the Catawba Hospital campus is comprised of a variety of buildings, ranging from small residential structures along the perimeter to a large 7-story concrete hospital at its core. Due to its remote location, the campus is very self-sustaining and houses its own water treatment plant, a central boiler plant, and a wastewater treatment plant. Water for each building is gravity fed from two large water tanks located uphill from the campus.

The campus originally started out as a resort built in 1858, which was later purchased by the Commonwealth of Virginia and converted into a tuberculosis treatment facility in the early 1900's. Many of the original resort buildings have since been demolished. The only evidence of the original resort that remains is an ornate iron gazebo located over one of the many springs on site and an old two-story building located up the hill.

The hospital specializes in serving adults including geriatric individuals who need mental health care. Many current buildings on campus were constructed in the early to mid-1900's, but the greenhouses and gymnasium were built in the latter part of the century. The newest building on site was built in the late-2000's, but most of the buildings are 70 to 80+ years old. Descriptions of each building and its general condition are in the attached conditions assessment report.

The following section provides a schematic narrative for creating a cost estimate for the concepts. The concept schematic narratives assume the basis of design the three options:

Option A Mini Continuum of Care Model

Option B Base Continuum of Care Model

Option C Enhanced Continuum of Care Model

Civil

Design Criteria

The site and associated improvements will be designed to meet all applicable standards, codes, and regulations of the Authorities Having Jurisdictions (AHJ). At a minimum, this will include review and approval from DEB, the Virginia Department of Transportation, Virginia Department of Environmental Quality, and the Virginia Department of Health. Additional agencies that may require approval include the Virginia Department of Conservation, and the Virginia Department of Historical Resources. If wetlands or waters of the US are to be disturbed, review and permitting will be required by the US Army Corps of Engineers or DEQ, depending on the nature of the disturbance and whether it is covered under the Nationwide Permit 39 or the Virginia SPGP-01.

As design progresses, the final material, system, and infrastructure selection will be made with input from the appropriate regulatory agency and end user to ensure the operation is efficient and the systems are easily maintainable. All aesthetic characteristics involving the site will be coordinated with the Commonwealth.

Existing utilities may be required to be relocated during construction. At no time will the existing utility service be interrupted. Temporary services will be designed and installed to serve existing buildings.

Where existing buildings or appropriate infrastructure are to be abandoned, the buildings or utilities shall be decommissioned for safety and security after each phase.

SITE CONSTRUCTION

A geotechnical investigation has not been performed at the project site. This will be performed during formal design. At a minimum, soil borings will be performed to determine bearing capacity for the building foundation, pavement design, and the depth to groundwater and rock. Infiltration tests will also be performed to determine applicable stormwater practices.

The existing site is mountainous terrain, with maximum grades varying between 2 and 50 percent. Barring the existence of a great volume of unsuitable soils, the site will target a balanced site, meaning no additional material will be transferred onto or away from the site. The grading activities will include mass grading, trench excavation, rock excavation, structural fill, over-excavation, compaction, and the construction of erosion and sediment control measures.

A blue line stream runs through the site through a combination of manmade channels and natural channels. This stream is classified as an R4SBC (Riverine, Intermittent, Streambed, Seasonally Flooded). In all options, portions of this stream are proposed to be disturbed so permitting through the US Army Corps will be necessary.

STORMWATER MANAGEMENT

The development of the site will result in a significant increase in stormwater runoff. To achieve minimum water quality requirements, a portion of the site could be converted into a conserved open space easement. There is ample area on the property that is considered unsuitable that could be conserved to help meet this requirement.

To achieve water quantity requirements, underground storage would be the most applicable based on the site constraints. To reduce the conservation area, additional manmade water quality devices could be implemented.

In general, the parking and lawn areas will be graded to curb inlets or yard drains and the roof drains will be collected in an underground pipe network. To assist with energy code compliance and assist with the load on the water system, a rainwater harvesting system could be utilized. Regardless of implementation, all stormwater will be directed to a detention system prior to leaving the site.

There are many options to achieve stormwater compliance. To ensure we have chosen the most cost-effective solution for both implementation and long-term maintenance cost, it is imperative that we coordinate closely with the Commonwealth to evaluate all possibilities.

SANITARY SEWER

The current sanitary sewer system is connected to an on-site sewage treatment plant and the associated sanitary sewer piping. The sewage system is designed to collect waste from the hospital and transport it by gravity to the treatment plant, which then releases the treated water into an unnamed tributary of Catawba Creek. At present, the treatment plant uses a combination of extended aeration and settlement chambers to meet the required standards.

Currently the system treats about 30,000 gallons per day, with a maximum treatment capacity of 120,000 gallons per day (GPD). Normally, the usage per person is 300 gpd per VDH standards. In this case, however, the facilities' average per day per person rate is used to determine an applicable flow rate for the campus.

Today there are 275 employees (in the peak shift) and 128 beds. This equates to a total of 403 equivalent people/beds. Using 30,000 gpd as the average daily demand, each person equates to 75 gallons per day of sewer usage and subsequent treatment volume.

The proposed expansions increase the bed count to 288 and increase the employee total to 550. Together, this totals 838 equivalent people/beds. At a rate of 75 gallons/day/person, the new total of sewer treatment volume for the campus is 62,850 gallons/day. This is within the current permitted capacity. As such, upgrades to the sewer treatment plant are not necessary.

Since a full survey was not completed, we cannot verify the current capacity of the gravity sewer piping. However, as there is ample fall across the site, it can be assumed that the current piping is adequate for both the existing and proposed conditions. Some piping was noted by staff to be terracotta, so any piping that is disturbed by construction should be assumed to need to be fully replaced. Some of the manholes on site are very old and are not properly sealed. In all options, we recommend that any old manholes in the vicinity of construction be replaced with new structures.

POWER DISTRIBUTION

The project will use the existing power distribution system of the power companies that serve the site. Power will be provided to all on-site signage, lighting, security, and other miscellaneous improvements. Existing easements may need to be relocated.

FIRE PROTECTION

Fire protection will be provided by an internal fire sprinkler system for new or renovated buildings and exterior fire hydrants. Needed fire flows will be calculated based on ISO calculations and site-specific building characteristics. Fire hydrants will be placed as required by the fire marshal to provide adequate coverage. During fire flow tests performed during the existing conditions study, there was 1250 gallons per minute for fire coverage, with a need of

90 minutes.for fire flow. This equates to 112,500 gallons of total volume, out of an available 250,000 gallons. Improvements to the water supply system will be discussed in the water section below.

Backflow prevention will be required on the fire line. This will be in an external fire connection vault or inside the building if space is available and the required access can be provided. Fire department connections will be located by coordinating hydrant locations and internal fire system design.

STEAM

Site steam lines are fed from the boiler plant located across from Catawba Hospital Drive. These lines serve various buildings around the campus. No improvements or modifications to the existing system are proposed or anticipated.

WATER

Potable Water is currently treated and distributed onsite. The water treatment plant provides 50,000 gallons of water per day, which serves 285 people during peak conditions, on average 175 gallons/person. Currently the water supply can provide 102,000 gallons per day via the natural spring that feeds the treatment plant. This water is then treated using media filtration and chlorination.

Upgrades to the water treatment plant are planned for 2025 (2025 Pall Membrane Filter system) and capital is already allocated for these upgrades. It is our understanding that these planned upgrades will handle the additional water treatment needs of all options for this project.

Further analysis is needed to determine if the line sizes that feed the new buildings can provide the needed fire and domestic demand. This analysis will be provided during final design. It would be assumed given the above information that some piping upgrades will be needed, specifically bringing existing pipes of 6” or less that feed new buildings up to a 12” pipe.

The proposed options differ slightly in what improvements are needed.

Option A:
Increases total peak demand to 443 people and adds 12 housing units (4 per Residential Building). Using the per person ratio (443 people x 175 gpd) and 300 gpd per housing unit, Option A increases the demand to 81,125 gallons per day, which is less than the 102,000 gallons permitted. As noted, the planned 2025 Pall Membrane System will increase the system's capacity to handle this additional load. No additional upgrades are proposed.

The 100,000-gallon chlorination tank has enough capacity to handle this additional load. While new pumps to pump from the chlorination tank to the top of the mountain storage tanks are not required to keep up with the demand, it is recommended that an automatic system be installed to avoid the issue of manually having to operate the pumps to fill the tanks. While considering this upgrade, we recommend the pumps be upgraded to allow for the storage tanks to fill more quickly.

The gravity tanks at the top of the mountain that pressurize the campus distribution system store 250,000 gallons. When including the new fire demand of 112,500 gallons, that brings the potential used volume of water during a fire event to 193,625 gallons. This does not provide an adequate factor of safety during a fire event. We recommend another 150,000-gallon tank be installed to bring the new volume up to 400,000 gallons.

Option B:
Increases total peak demand to 548 people and adds 16 housing units (4 per Residential Building). Using the per person ratio (548 people x 175 gpd) and 300 gpd per housing unit (300 x 16), Option B increases the demand to 100,700 gallons per day, which is less than the 102,000 gallons permitted. As noted, the planned 2025 Pall Membrane System will increase the capacity of the system to handle this additional load. No additional upgrades are proposed.

The chlorination tank is a 100,000-gallon tank, which has enough capacity to handle this additional load. New pumps would be needed to handle the additional domestic demand, along with setting up an automatic system for filling the tanks instead of the manual operation. Along with the planned water treatment plant upgrades, rainwater harvesting could be used to reduce the demand on the water treatment plant and chlorination tank, along with other benefits of stormwater reduction and energy code compliance.

The gravity tanks at the top of the mountain that pressurize the campus distribution system store 250,000 gallons. When including the new fire demand of 112,500 gallons, that brings the potential used volume of water during a fire event to 213,200 gallons. This does not provide an adequate factor of safety during a fire event. We recommend a 200,000-gallon tank be installed to bring the new volume up to 450,000 gallons.

Option C:
Increases total peak demand to 602 people. Using the per person ratio, Option C increases the demand to 111,350 gallons per day, which is just slightly more than the 102,000 gallons permitted. As previously noted, the planned 2025 Pall Membrane System will increase the capacity of the system to handle this additional load. No additional upgrades are proposed.

The chlorination tank is a 100,000-gallon tank, which has enough capacity to handle this additional load. New pumps would be needed to handle the additional domestic demand, along with setting up an automatic system for filling the tanks instead of the manual operation. Along with the planned water treatment plant upgrades, rainwater harvesting could be used to reduce the demand on the water treatment plant and chlorination tank, along with other benefits of stormwater reduction and energy code compliance.

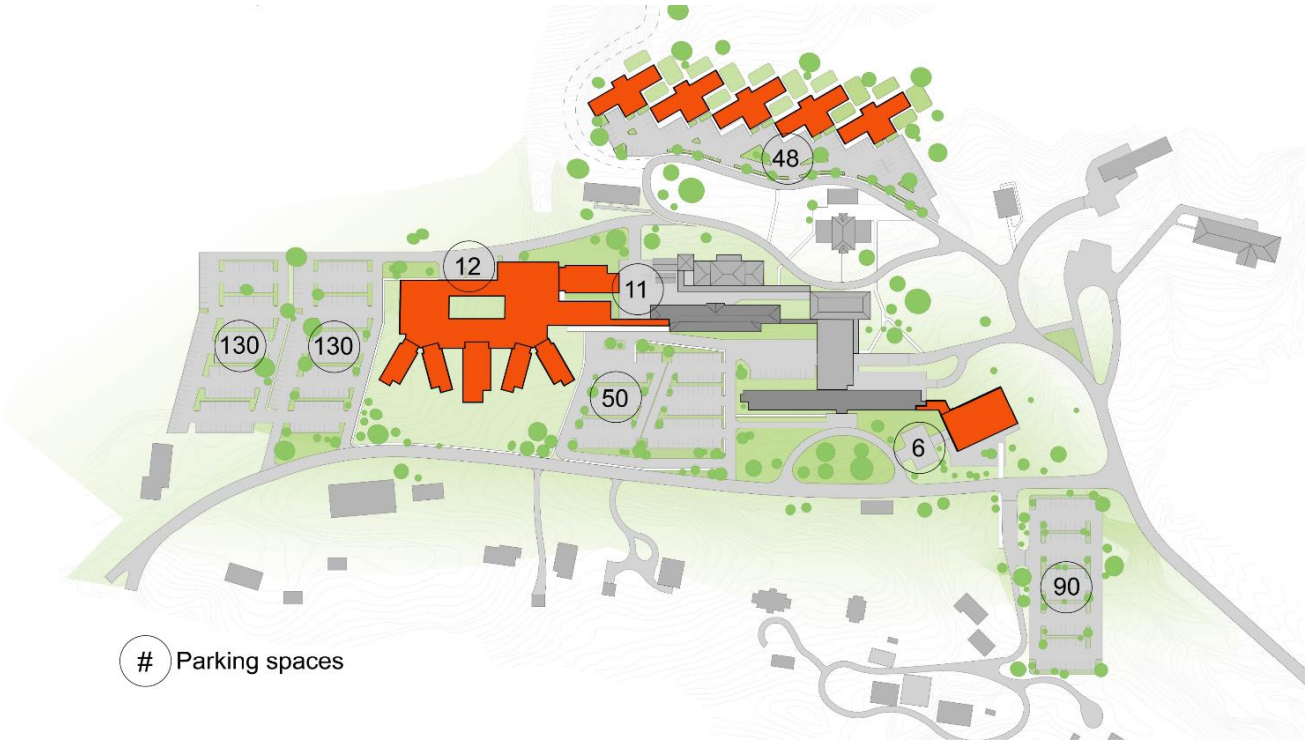
The gravity tanks at the top of the mountain that pressurize the campus distribution system store 250,000 gallons. When including the new fire demand of 112,500 gallons, that brings the potential used volume of water during a fire event to 223,850 gallons. This does not provide an adequate factor of safety during a fire event. We recommend a 200,000-gallon tank be installed to bring the new volume up to 450,000 gallons.

ASPHALT PAVING

Asphalt paving will be utilized for all on-site drives and parking areas. Final pavement design recommendations will be provided by the geotechnical engineer during final design. Drive aisle and fire access will be coordinated with the fire marshal to ensure emergency access requirements are met. Heavy duty and light duty pavement will be placed so that emergency vehicles and large vehicles do not destroy the asphalt or degrade the surface beyond what is typical for the life cycle of this pavement material.

As the required parking spaces for the proposed work have limited impact based on the proposed phasing, parking counts have been analyzed against Option C using CSPM parking requirements based on use. Parking counts are summarized in the table and roughly shown in the concept sketch below:

SITE PLAN PARKING COUNT LOCATIONS - OPTION C – ENHANCED CONTINUUM OF CARE MODEL



PARKING CALCULATIONS

Building	Required	
SUD Inpatient/Detox	*1 per 2 employees or beds*	(275 employees + 160 beds) / 2 = 218 spaces
SUD Residential	*1 per living unit*	1 x 40 living units = 40 spaces
SUD Outpatient	*1 per 250 gsf*	52,000 sf / 250 = 208 spaces
Total Parking Demand		466 Parking Spaces (477 Provided)

CONCRETE PAVING

Concrete pavement is proposed for all sidewalks, plazas, and loading areas. All decorative paving, stamping, and paintings will require a mock-up/sample to be reviewed and approved by the owner.

FENCES AND GATES

Fences and gates will be placed as necessary around the site to prevent ingress or egress where needed.

SOIL PREPARATION, TURF AND GRASSES, AND PLANTS

The final design will include a detailed landscape plan showing limits of turf grass, plant type, trees, shrubs, and irrigation. This design will incorporate local plant life to ensure long term sustainability.

TELEPHONE, DATA, COMMUNICATIONS

The site is currently served by telephone, data, and communications services. Those services will be relocated or extended as necessary to serve the new or renovated areas.

Architecture & Life Safety

Design Concepts

BUILDING 15: EXISITING CATAWBA HOSPTIAL

Built in 1953, this existing building is a large seven-story concrete building with load bearing concrete walls at the exterior and a single row of columns and a continuous drop panel running parallel along the central corridor. The floors and roof structure appear to consist of one-way slab construction. No major renovations are anticipated within this building, but minor renovations to incorporate a connector corridor from this building to a new 3 to 4-story business

occupancy building would occur.

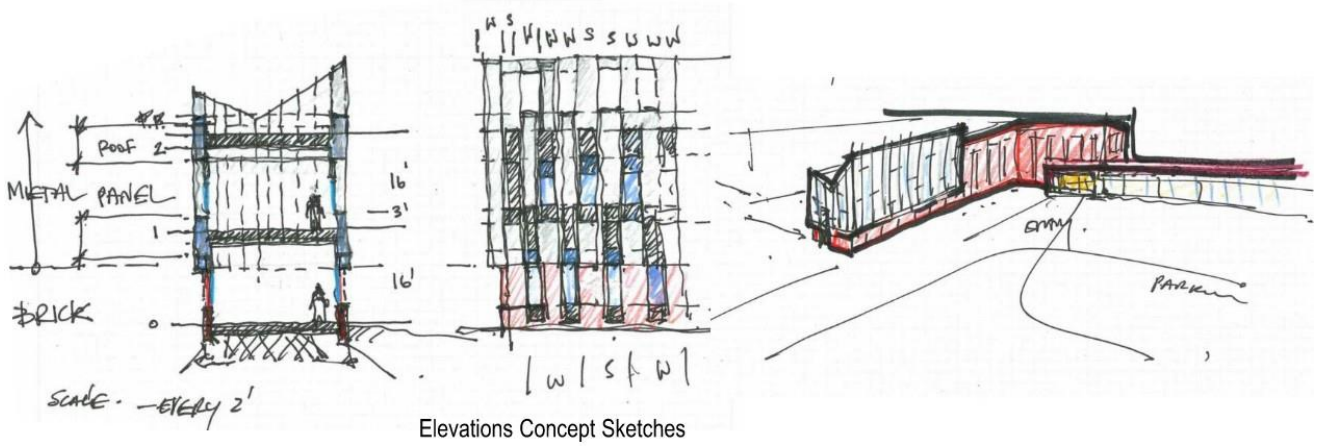
Building 15 will be connected to the SUD Outpatient building via a new pedestrian walkway connector constructed in accordance with the VCC Chapter 3104. The connector shall be built from non-combustible construction. The walls separating the connector from each building shall be capable of resisting the passage of smoke as required by VCC § 3104.5.2 and shall be fully sprinklered. Only materials and decorations approved by the building official shall be in the pedestrian walkway.

BUILDING 17: CATAWBA HOSPITAL TREATMENT MALL

Built in 1939, this existing building is a large two-story concrete and masonry building with a partial basement. The floor structure appears to consist of concrete on metal lathe supported by open web steel joists which bear on interior and exterior load bearing walls. The roof structure appears to consist of wood rafter framing that bears on a concrete roof slab that spans between the exterior and interior load bearing walls. For all three options, this building will have the interior finishes upgraded only.

The existing building is assumed to be a Type VA construction building. The building will have fire sprinklers throughout and be provided with a fire alarm detection and notification system. Record documents indicate that the building is considered a Group B occupancy. The existing building is approximately 30,175 square feet.

Building 17 will be connected to the new SUD Inpatient Hospital building via a new pedestrian walkway connector constructed in accordance with the VCC Chapter 3104. The connector shall be built from non-combustible construction. The walls separating the connector from each building shall be capable of resisting the passage of smoke as required by VCC § 3104.5.2 and shall be fully sprinklered. Only materials and decorations approved by the building official shall be in the pedestrian walkway.



Elevations Concept Sketches

THE SUD INPATIENT HOSPITAL

The new SUD Inpatient Hospital consists of three main components:

- The Main Inpatient Hospital Building
- The Outpatient Building, and
- The Residential housing on the hill

All options include these components, and the variation is a function of the increased capacity of the option. Below is described the options and what is included in each.

OPTION A – MINI-CONTINUUM OF CARE MODEL

This model is considered the minimum effort necessary to effectively deal with the increasing SUD cases in the area. To accomplish this, 64 SUD Inpatient beds would be provided in a new building that will meet best practices and conform it into a state-of-the-art building that is desired by the Commonwealth. Behind the existing Building 15 on the hill three new residential buildings would be built to provide SUD long term, short term, and recovery residential units, which total 96 beds.

A new 52,000 square foot three-story SUD outpatient facility would be built adjacent to Building 15 to provide outpatient services, administrative, clinical, educational and research space unique to SUD treatment.

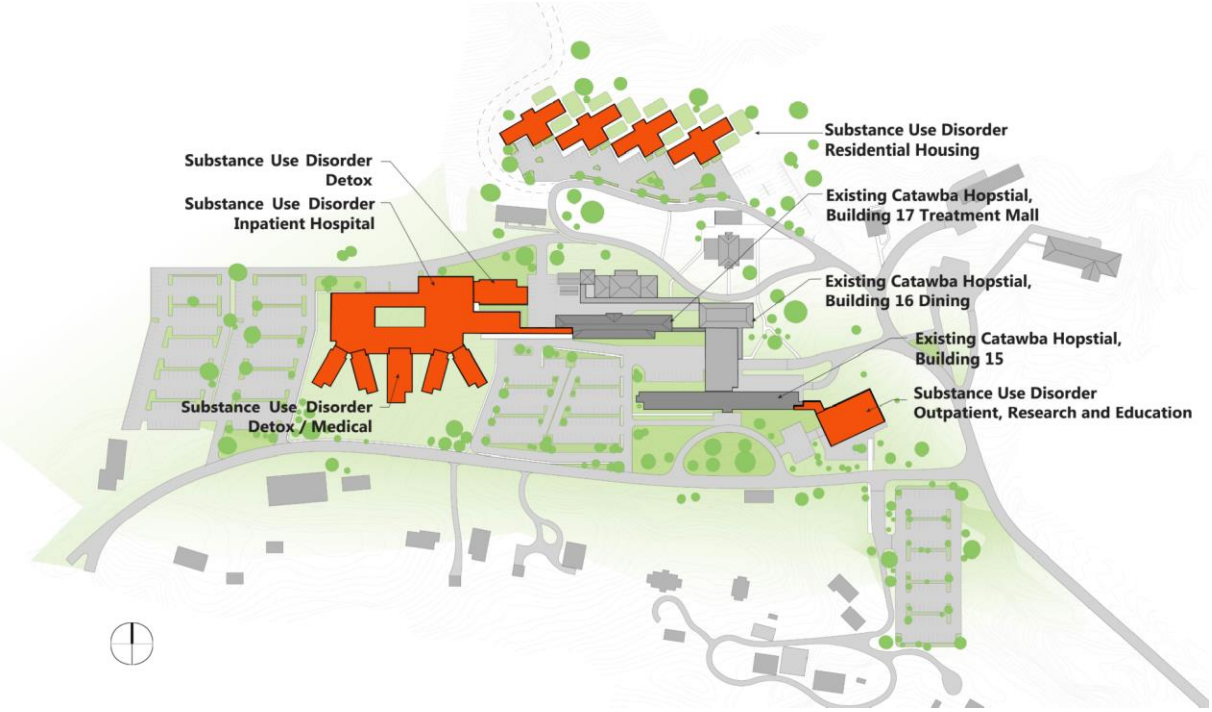
Concept Site Plan- Option A – Mini-Continuum of Care Model

OPTION B – BASE CONTINUUM OF CARE MODEL

To accomplish this Option, 104 SUD Inpatient beds would be provided in a new building that will meet best practices and conform it into a state-of-the-art building that is desired by the Commonwealth. Behind the existing Building 15 on the hill four new residential buildings would be built to provide SUD long term, short term, and recovery residential units, which total 128 beds.

A new 52,000 square foot, three-story SUD outpatient facility would be built adjacent to Building 15 to provide outpatient services, administrative, clinical, educational and research space unique to SUD treatment.

CONCEPT SITE PLAN - OPTION B – BASE CONTINUUM OF CARE MODEL

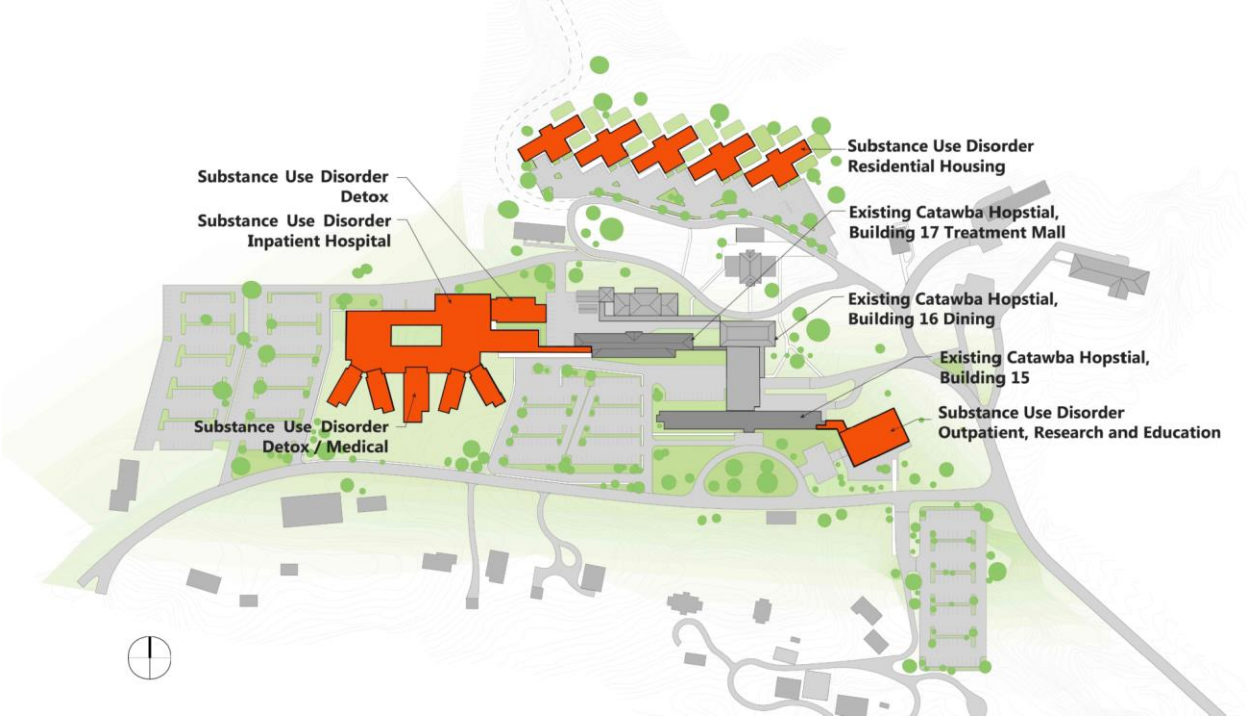


OPTION C – ENHANCED CONTINUUM OF CARE MODEL

For this Option, 128 SUD Inpatient beds would be provided in a new building that will meet best practices and conform it into a state-of-the-art building that is desired by the Commonwealth. Behind the existing Building 15 on the hill five new residential buildings would be built to provide SUD long term, short term, and recovery residential units, which total 160 beds.

A new 70,000 square foot four-story SUD outpatient facility would be built adjacent to Building 15 to provide outpatient services, administrative, clinical, educational and research space unique to SUD treatment. One of the stories would be designated as shell space to accommodate for future growth.

CONCPET PLAN - OPTION C – ENHANCED CONTINUUM OF CARE MODEL

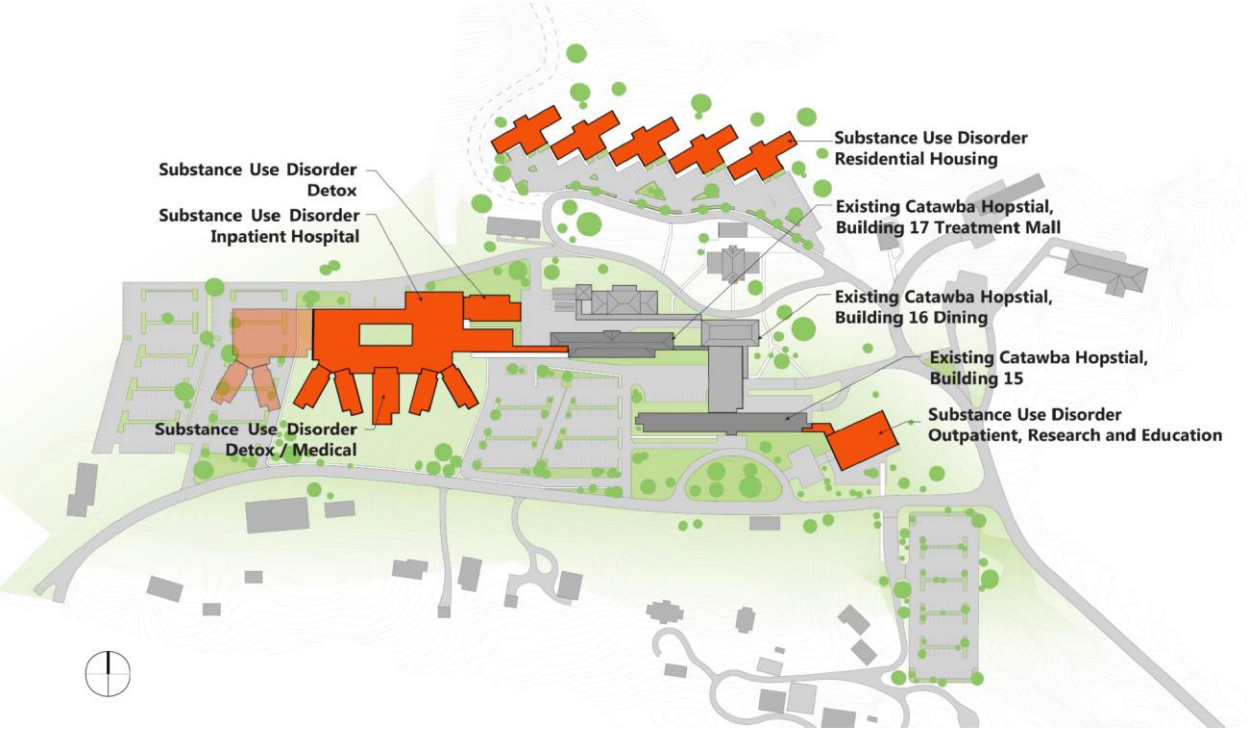


OPTION C – ENHANCED CONTINUUM OF CARE MODEL – FUTURE EXPANSION

Option C can be expanded in the future into the parking lot depending on growth of the program. This future expansion has not been programmed, or cost estimated.

CONCEPT SITE PLAN - OPTION C – ENHANCED CONTINUUM OF CARE MODEL

FUTURE EXPANSION



CONSTRUCTION TYPE AND BUILDING OCCUPANCY GROUP

The SUD Inpatient Hospital will be Type IB construction as required for multiple story buildings classified as I-2. The VCC permits building to be 10 stories when sprinklered at a maximum height of 180 feet, the building will be 2 stories. The allowable area per floor without taking advantage of perimeter access is unlimited per floor.

All corridors in Group I-2 occupancies shall be continuous to exits and shall be separated from other areas per VCC § 407.3 except waiting and similar areas. All corridors shall be constructed as smoke partitions.

Smoke barriers shall be provided to subdivide every story used by persons receiving care, treatment or sleeping into not fewer than two smoke compartments. Smoke barriers shall be provided to subdivide other stories with an occupant load of 50 or more persons, into not fewer than two smoke compartments. Smoke compartments are limited to 22,500 square feet, except a 40,000 square foot limit is permitted for I-2, Condition 2 occupancies under certain conditions.

Smoke barriers shall have a 1-hour fire-resistance rating. Travel distance from any point to a smoke compartment to a smoke barrier door shall not be greater than 200 feet.

SUD RESIDENTIAL HOUSING

This new two-story light gage steel and masonry building is intended to serve as an SUD Residential housing building for incoming residents as needed. Option A provides three 2-story buildings with two 8-bed units per floor, a total of 16 beds per floor and 32 beds per structure. Each additional housing building of 32 beds is being added for each sequential option, below lists the number of units included in each option:

- Option A: 12 units (8 beds each), 3 Residential structures at 32 beds each; Total 96 beds
- Option B: 16 units (8 beds each), 4 Residential structures at 32 beds each; Total 128 beds
- Option C: 20 units (8 beds each), 5 Residential structures at 32 beds each; Total 160 beds

The buildings will be 8,000 square feet per floor, and 16,000 square feet total for each building. The buildings will be defined as Group I-3 use. Type IIB construction is required for multiple story buildings classified as I-3. The VCC permits the building to be 2 stories when sprinklered at a maximum height of 75 feet, the building will be 2 stories. The allowable area per floor without taking advantage of perimeter access is 30,000 square feet per floor.

Smoke barriers complying with VCC § 408.8 and § 709 shall be provided to divide every story occupied by residents for sleeping into no fewer than two smoke compartments. The distance of travel to a door in a smoke barrier from any points in a room shall not be greater than 200 feet.

Smoke control for each smoke compartment shall be in accordance with VCC § 408.9.1 through 408.9.3 unless the smoke compartments are equipped with operable windows or windows that are readily breakable.

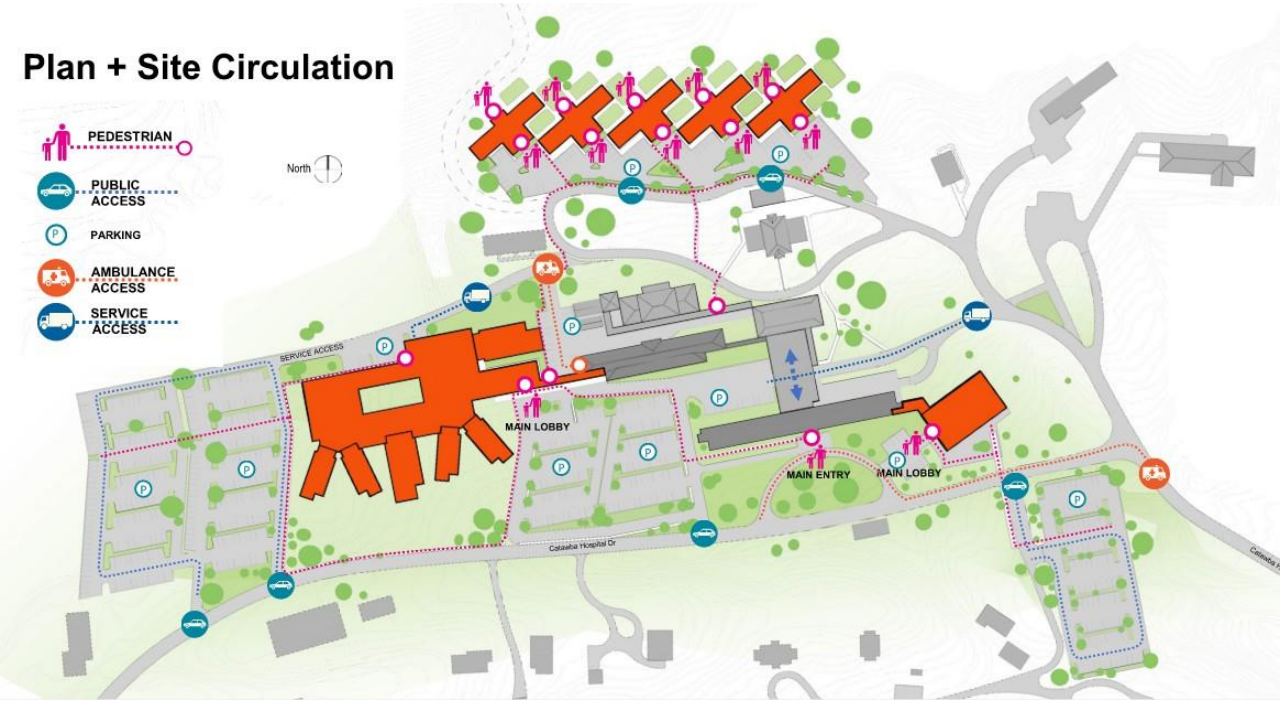
SUD Residential Housing Looking Northwest – Option C

SUD Outpatient Building

This new steel framed building is intended to serve as an outpatient education and research building for the residents. The building would also house the new SUD administrative and support spaces. Options A and B will be similar in scope and size (3 story structure); however, Option C provides an additional floor that will be shell space for future expansion.

The buildings will be 70,000 square feet total. The buildings will be defined as Group B use. Type IIB construction as required for multiple story buildings classified as Group B. The VCC permits the building to be 4 stories when sprinklered at a maximum height of 75 feet, the building will be 4 stories (max). The allowable area per floor without taking advantage of perimeter access is 69,000 square feet per floor.

Below is a concept diagram of site circulation, assess, and building entries.



Design Criteria
Building construction and life safety requirements design will conform with the design guidelines of all applicable codes and standards of the Authorities Having Jurisdiction (AHJ).

ARCHITECTURAL

Codes, Design Guidelines, and Material Standards
Applicable codes include but are not limited to:

- 2021 Virginia Uniform Statewide Building Code (VUSBC)
- 2021 Virginia Construction Code (VCC)
- 2021 Virginia Statewide Fire Prevention Code (SFPC)
- 2021 Virginia Existing Building Code (VEBC)
- 2010 ADA Standards for Accessible Design
- NFPA 10 – Standard for Portable Fire Extinguishers (2018 edition)
- NFPA 13 – Standard for Installation of Sprinkler Systems (2019 edition)
- NFPA 14 – Standard for the Installation of Standpipe and Hose System (2019 edition)
- NFPA 70 – National Electrical Code (2020 edition)
- NFPA 72 – National Fire Alarm and Signaling Code (2019 edition)
- NFPA 80 – Standard for Fire Doors and Other Opening Protectives (2019 edition)
- NFPA 99 – Health Care Facilities Code (2021 edition)
- NFPA 101 – Life Safety Code (2021 edition)
- CPSM – Latest version of the CPSM to be used during design

CONSTRUCTION TYPE AND USE GROUP (SUD INPATIENT HOSPITAL)

- Type IB Construction – see building narratives for further information:

- 2 Hr. Primary Structural Frame
- 2 Hr. Bearing Walls (Interior and Exterior)
- 2 Hr. Floor Construction and associated secondary structural members.
- 1 Hr. Roof Construction and associated secondary structural members.
- Use group for the concept would be I-2 with mixed uses, with any required separation per code of B use group, various A use groups to be further defined in full design.

CONSTRUCTION TYPE AND USE GROUP (SUD RESIDENTIAL HOUSING)

- Type IIB Construction – see building narratives for further information:
- 0 Hr. Primary Structural Frame
- 0 Hr. Bearing Walls (Interior and Exterior)
- 0 Hr. Floor Construction and associated secondary structural members.
- 0 Hr. Roof Construction and associated secondary structural members.
- Use group for the concept would be I-3 with mixed uses, with any required separation per code of B use group, various A use groups to be further defined in full design.

CONSTRUCTION TYPE AND USE GROUP (SUD OUTPATIENT BUILDING)

- Type IIB Construction – see building narratives for further information:
- 0 Hr. Primary Structural Frame
- 0 Hr. Bearing Walls (Interior and Exterior)
- 0 Hr. Floor Construction and associated secondary structural members.
- 0 Hr. Roof Construction and associated secondary structural members.
- Use group for the concept would be B with mixed uses, with any required separation per code of use group A to be further defined in full design.

EXTERIOR ARCHITECTURAL DESIGN AND CORE ELEMENTS

Exterior Wall

- Pre-cast insulated concrete panels with a combination of sandblasted finish and brick veneer inserts. Allow 50% of area sandblasted finish and 50% of area brick veneer inserts. Precast concrete will have custom aggregate mixture and white cement matrix.
- Brick Color: standard manufacturer’s colors and finishes.
- Wall system is to have value of R-23 minimum.

Exterior Windows, Doors, and Louvers

- Aluminum clear anodized storefront window framing system with insulated glazing.

- At patient access areas, provide 1” insulated glass system at exterior with tempered and laminated glass panels and ½” tempered glass interior safety panel.
- At areas with no patient access, provide 1” insulated glass system with tempered and laminated glass panels.
- Windows are primarily inoperable. Those that are operable within patient areas shall be provided with security screens with access areas keyed locks on the interior face. Horizontal blinds are integral to the window unit.
- All non-patient area windows are to be ½” tempered laminated glass.
- Aluminum clear anodized doors and frames with ½” tempered clear glass.
- Aluminum clear anodized louvers and integral profiled vertical and horizontal mullions and glass.

Roofing System

- For pitched roofs – standing seam metal roof (steel with fluorocarbon finish) in manufacturer standard colors. Roof concept based on UL P-515 with roofing insulation on the top cord of the light gage steel truss. Minimum roof R-values of R-30ci or R-38 for attic.
- For flat roofs – built-up roof sloped to drain with tapered insulation, protection board and vapor barrier, and minimum roof R-values of R-40ci.

Miscellaneous Metal Work

- Painted galvanized metal parapet caps, overflow scuppers, coping, exposed flashing, and metal railings.
- Architecture metal work for railings

Vertical Transportation

- The stairs shall be metal pan, concrete filled.
- Elevators shall be hydraulic elevators with two (2) stops each. The elevator interior finishes shall be stainless steel. Elevators shall have glass doors for safety reasons.

INTERIOR ARCHITECTURAL DESIGN

Floor and Base Finish Materials

- Carpet tile with rubber base in office areas, waiting rooms, consult rooms and office corridors areas where carpet is appropriate for the activity.
- Resilient vinyl tile with rubber base in staff and heavy traffic corridors, storage rooms and clean & soiled rooms
- Rubber sheet goods with integral base in patient rooms, seclusion rooms and patient group/activity rooms where rubber sheet goods are appropriate for the activity.
- Fluid Applied Flooring – epoxy based in patient toilet/shower rooms and private toilet rooms. Provide ceramic tile wainscot, 54” AFF in all patient/private/public toilet rooms.
- Sealed concrete floors with rubber base in mechanical, electrical, telecom/security equipment rooms and loading dock areas.
- Recessed Walk-off mat in all entrance vestibule areas.

Interior Partitions

- Typical partition is 3-5/8” metal stud wall with sound attenuation batts and Type X 5/8” impact resistant gypsum wall board both sides to structural deck above.
- Partitions in patient units shall be 3-5/8” metal studs with sound attenuation batts and Acrovyn wall protection to 10’-0” AFF with 5/8” impact resistant drywall.

- Corridor side walls in patient units to be similar construction to partitions within patient units but with Acrovyn wall protection to 10’-0” AFF with 5/8” impact resistant drywall.
- Furred partition is 1-5/8” metal stud furred partition with Type X 5/8” gypsum wall board, one side only, for plumbing chases.
- The plumbing wall partition is 6” metal stud wall with 5/8” FR gypsum wall board both sides to structural deck above to conceal plumbing fixture supply or drainage piping or fixture carriers.
- 1-hour fire-rated smoke and fire-rated partitions, where required for room enclosure or smoke compartmentalization.
- 2-hour fire-rated smoke and fire-rated partitions, where required for room enclosure or smoke compartmentalization.

Ceiling and Finish Materials

- Suspended acoustical tile ceiling materials with high STC rating used in corridors, office areas, consult rooms, large storage areas, clean and soiled rooms, etc.
- In patient corridor areas, group rooms, dining and day rooms, etc. acoustical tile ceilings shall be installed at 10’-0” AFF, typical. In Maximum Security corridor areas, group rooms, dining and day rooms, etc. use gypsum wallboard ceiling materials with acoustical ceiling panels where appropriate for sound control.
- Gypsum wallboard ceiling materials used in public, private and patient bedrooms, toilet rooms, shower areas, janitor/housekeeping closets, secure areas etc.
- In patient bedrooms, toilet rooms, shower areas, gypsum wallboard ceilings shall be installed at 10’-0” AFF, typical.
- Provide access panels in ceilings as required by code. Access panels shall meet adjacent wall/ceiling fire rating. All access panels’ doors shall be spring loaded and provided with keyed entry and installed with tamper resistant screws.

Interior Windows and Doors

- Solid wood doors, stained, shall be used for offices, patient exam rooms, patient rooms, toilet rooms, closets, etc.
- Hollow metal doors, painted in penthouses areas and loading area.
- Office/Patient areas:
    - All interior windows in patient areas to be 1/2” tempered glass or equal in hollow metal frames.
    - All other interior windows to be ½” tempered glass.

Casework

- Public Areas:

- Case fronts and doors – plastic laminate veneer finish on medium density fiber board (MDF) substrate and water resistant MDF in wet areas. Color selection from standard manufacturer's color range. All casework to be fully lockable.
- Handles on casework to be recessed, typ.
- Countertops and backsplash – solid surface materials from manufacturer's standard color range.

- Patient Areas:
  - Door-less cubbies to be provided for patient's belongings. Cubbies shall be bolted to the wall with tamper resistant screws.

Fixtures, Furniture, and Equipment

The behavioral healthcare furniture, fixtures, and equipment will be specified to help patients care in behavioral health environments. Behavioral healthcare furniture needs to be designed to meet the unique needs of patients, combining durability and safety with comfort and aesthetic. Furniture for behavioral healthcare units must provide patients with a calming and safe environment. In addition, furniture and seating products should not have surface joints or seams to mitigate bacteria growth.

Structural

Design Concepts

BUILDING 15: EXISTING CATAWBA HOSPITAL

Built in 1953, this existing building is a large seven-story concrete building with load bearing concrete walls at the exterior and a single row of columns and a continuous drop panel running parallel along the central corridor. The floors and roof structure appear to consist of one-way slab construction. No major structural renovations are anticipated within this building, but minor structural renovations would occur to incorporate a connector corridor from this building to a new 3 to 4-story SUD outpatient building.

Structurally across all three options, we expect to create a new opening in the existing corridor wall for a new connector corridor between Building 15 and the new SUD outpatient building. Likely this connector corridor structure will be separated from the existing building via an expansion joint. Given the buildings' age, we anticipate that minor structural repairs may also be necessary.

BUILDING 17: EXISTING CATAWBA HOSPITAL TREATMENT MALL

Built in 1939, this existing building is a large two-story building with load bearing concrete and multi-wythe brick masonry walls. Floors are comprised of concrete on metal lathe mesh supported on open web steel joists. The roof is comprised of wood frame rafters and wood roof sheathing supported on a concrete and steel joist attic floor. No major structural renovations are anticipated within this building, but minor renovations would occur to incorporate a connector corridor from this building to the new 2-story SUD inpatient hospital building.

Structurally across all three options, we expect to create a new opening in the existing corridor wall for a new connector corridor between Building 17 and the new inpatient hospital building. Likely this connector corridor structure will be separated from the existing building via an expansion joint. Given the buildings' age, we anticipate that minor structural repairs may also be necessary.

SUD OUTPATIENT BUILDING

This new 3 to 4 story steel framed building is intended to serve as an outpatient education and research building for the residents. The building would also house new administrative and support spaces. Options A and B will be similar in scope and size (3 story structure); however, Option C introduces an additional top floor of shell space for future expansion (4 story structure).

SUD INPATIENT HOSPITAL

Several existing buildings (Buildings 1, 2, 18, 19, and 53) would be demolished to make space for the new 2-story SUD Inpatient Hospital Building and adjacent parking areas. This new two-story steel and masonry building is intended to serve as a substance use disorder hospital facility for incoming residents. Options A, B, and C will be similar in scope, with additional square footage (wings) added and shell space fit-outs for additional beds for each sequential option.

SUD RESIDENTIAL HOUSING BUILDINGS

Several new two-story light gage steel and concrete / masonry buildings will be built near Existing Building 22 (Building 22 to be removed) to provide SUD long term, short term, and recovery residential spaces. The buildings would be tucked into the hillside and feature large grade offsets between the front and back of each building, utilizing partial basement walls and retaining walls in the design. Three new residential buildings will be built for Option A, totaling 96 beds. Four new residential buildings will be built for Option B, totaling 128 beds. And five new residential buildings will be built for Option C, totaling 160 beds.

Design Criteria

Structural design will conform with the design guidelines of all applicable codes and standards of the Authorities Having Jurisdiction (AHJ).

Codes, Design Guidelines and Material Standards

- 2021 Virginia Uniform Statewide Building Code

  (VUSBC) 2021 Virginia Construction Code (VCC)
- American Society of Civil Engineers (ASCE), Minimum Design Loads for Buildings and Other Structures (ASCE 7-16)
- American Concrete Institute (ACI), Building Code Requirements for Structural Concrete (ACI 318-19)

- American Institute of Steel Construction (AISC), AISC Manual of Steel Construction - 15th edition, AISC 360-16
- American Welding Society, AWS, D1.1, D3.1, & D1.4

  Steel Deck Institute (SDI), SDI Diaphragm Design

  Manual
- American Society for Testing and Materials (ASTM), material standards as noted.
- American Iron and Steel Institute (AISI), AISI Specifications for Design of Cold Formed Steel Structural Members
- Steel Joist Institute (SJI), SJI Catalog of Standard Specifications and Load Tables for Steel Joists and Joist Girders
- American Concrete Institute (ACI), ACI Building Code Requirements and Specifications for Masonry Structures (ACI 530-19 and ACI 530.1-19)

Foundations

Building foundations will be designed based upon recommendations set forth in the geotechnical report. No geotechnical information has been gathered for this site as of the writing of this study, therefore, the method of excavation, site preparation, ground water mitigation design and foundation design for the proposed site cannot be described. For pricing purposes, it is assumed that a conventional shallow foundation system will be used. Frost depth in this area is 24 inches, thus the bottom of all exterior footings shall bear 24 inches below exterior grade at a minimum. Columns will be supported on individual square spread footings and walls would be supported on a continuous strip footing. These footings would be poured integral to each other where column and wall footings overlap.

The project site contains existing buildings; as part of this project, all structures within the footprint of the new inpatient and outpatient buildings, as well as the new residential buildings, would be demolished. The foundations of the existing building should be removed within the new building footprint. If outside of the building footprint, they may be abandoned in place below grade.

Superstructures

Typical grade slabs will consist of a conventional 5-inch-thick concrete slab on grade with welded wire fabric reinforcing on porous fill and a continuous vapor retarder. At areas subject to trucking, such as at a loading dock or at any wheeled traffic areas, the grade slab will be an 8-inch-thick slab on grade with reinforcing bars. Anticipated column spacing at all new buildings will be approximately 30 feet.

For the new 2 story SUD inpatient hospital building connected to Building 17, the main gravity support shall consist of reinforced 8-inch-thick CMU load-bearing wall construction. Exterior CMU walls will be used along the perimeter and steel columns will be used at the interior to provide program flexibility and to maintain adequate bay sizes. Any below grade basement walls would likely consist of 12” reinforced concrete basement walls. Elevated floors would comprise

of a 3-1/4-inch-thick lightweight concrete slab on 2-inch composite decking (5-1/4 total thickness) reinforced with welded wire fabric (UL D925). The deck will be supported on composite steel beam framing with maximum spacing limited to 9 feet on center. At sloped gable and hip roofs, the roof system can be comprised of cold-formed metal trusses spaced at 4 feet on center maximum supporting 1-1/2-inch-deep metal roof deck (UL P526). The trusses would bear on the CMU walls and steel beam framing. At flat roof sections, the roof shall consist of 1-1/2-inch-deep metal roof deck supported by open web steel joist framing spaced at 5 feet on center maximum (UL P719). The main lateral force resisting system for the building will be ordinarily reinforced masonry shear walls. The connector corridor to Building 17 would likely consist of steel framing supporting 1-½-inch-deep metal roof deck, utilizing moment frames as lateral support. The connector corridor would be separated from the existing building via an expansion joint.

At the new 3 to 4 story SUD outpatient building connected to building 15, the main gravity support shall consist of composite steel beam and column framing. Exterior walls will be comprised of 8-inch cold-formed steel framing. Elevated floors would consist of a 3¼ inch thick lightweight concrete slab on 2-inch composite decking (5¼ total thickness) reinforced with welded wire fabric (UL D925). The deck will be supported on composite steel beam framing with maximum spacing limited to 9 feet on center. Assuming the roof of this building is flat, the roof shall consist of 1½ inch deep metal roof deck supported by open web steel joist framing spaced at 5 feet on center maximum (UL P719). The main lateral force resisting system for this building will be comprised of concentric braced frames. The connector corridor to Building 15 would likely consist of steel framing supporting 1-½-inch-deep metal roof deck, utilizing moment frames as lateral support. The connector corridor would be separated from the existing building via an expansion joint.

The new 2 story SUD residential buildings up on the hill shall be tucked into the hillside. Due to the steep grades at this location, the lower level will be at grade on the downhill side of the structure, with partial basement walls along the perimeter toward the uphill side of the structure. The lower-level basement walls will consist of 12” concrete basement walls at retaining conditions, while the remainder of the structure is comprised of 8-inch and 6-inch cold-formed steel framing as exterior and interior load-bearing walls, respectively. Elevated floors shall consist of a 3-inch-thick normal weight concrete slab on 9/16-inch form decking (3-1/2 total thickness) reinforced with welded wire fabric. The elevated floor slabs would be supported on open-web steel joist framing spaced at 2 feet on center. At sloped gable and hip roofs, the roof system can be comprised of cold-formed metal trusses spaced at 4 feet on center maximum supporting 1-1/2-inch-deep metal roof deck. The trusses would bear on the cold-formed steel framed bearing walls. At flat roof sections, the roof shall consist of 1-1/2-inch-deep metal roof deck supported by open web steel joist framing spaced at 5 feet on center maximum. The main lateral force resisting system for this building will be comprised of light framed (cold-formed steel) walls sheathed with wood structural panels rated for shear resistance.

Materials of Construction:

Concrete

- 28-day concrete strengths:
- Interior foundations and slabs on metal deck - 3,000 psi (coordinate with final UL rating)
- Interior grade slabs – 4,000 psi
- Exterior concrete such as exterior footings, site retaining walls, exterior grade slabs, and exterior mechanical pads - 4,500 psi. Additionally, all exterior concrete shall be air entrained.
- Reinforcing Steel, ASTM A615, Grade 60 deformed bars, Fy = 60 ksi
- Welded Wire Fabric per ASTM A185

Masonry

- Concrete Masonry Units (CMU) F'm = 1,900 psi
- Reinforcing Steel, ASTM A615, Grade 60 deformed bars, Fy = 60 ksi
- Grout, ASTM C476 F'm = 3000 psi
- Mortar, ASTM C270, Type M or S F'c = 1,800 psi
- Joint Reinforcement, ASTM A82 - Truss type in unreinforced CMU walls/ ladder type in CMU walls with vertical reinforcing steel. Joint reinforcing shall be hot dipped galvanized after fabrication.

Structural Steel

- Wide Flange and Tee shapes, ASTM A992 Fy = 50 ksi
- Angles, channels and plates, ASTM A36 Fy = 36 ksi
- Tubes, ASTM A500, Grade B Fy = 46 ksi
- Pipes, ASTM A53, Grade B Fy = 35 ksi
- Headed Studs Fy = 50 ksi
- Anchor Bolts, ASTM A36 or ASTM F1554, UNO Fy = 33 ksi
- High Strength Connection Bolts, ASTM A325
- Welding Electrodes E70XX
- Steel Joists
- K series and KCS series per the Steel Joist Institute
- Steel Decking
- Metal Roof Deck, Galvanized ASTM A653, G60 Fy = 33 ksi, Type B
- Metal Floor Deck, Galvanized ASTM A653, G60 Fy = 50 ksi, Composite

Cold-Formed Steel Framing

- Galvanized per ASTM A1003 with minimum G60 coating.
- Minimum 20 Gage wall framing at 24 inches on center (typical)
- Minimum 18 Gage wall framing at 16 inches on center (at brick backup)

Design Loads

Design loads will conform to the minimum requirements of the IBC. The structure shall be designed to support all dead loads such as the weight of the structure, partitions, flooring, ceiling, sprinklers, high density file storage, mechanical equipment, roofing, and all other built-in installations. Additionally, all minimum live loads as indicated shall be supported.

GRAVITY LOADS

- Floor Dead Load = 80 PSF (includes assumed self-weight of structure)
- Floor Live Loads:
    - Assembly areas = 100 PSF
    - Offices = 50 PSF (+ 15 PSF for partitions)
    - Resident Rooms = 40 PSF
    - Stairways = 100 PSF
    - Lobbies = 100 PSF
    - Corridors (first floor) = 100 PSF
    - Corridors (upper floors) = 80 PSF
    - Electrical and Mechanical Rooms = 150 PSF
- Roof Dead Load = 30 PSF (includes assumed self-weight of structure)
- Roof Live Loads:
    - Live Load = 30 PSF minimum
    - Snow Load: The campus sits within a Case Study area.
    - Ground snow load = 30 PSF (provided by Roanoke County government)
    - Snow exposure factor (Ce) = 1.0
    - Snow load importance factor (Is) = 1.10 (Risk Category III)
    - Thermal factor (Ct) = 1.0 (heated)
    - Minimum snow load = 22 PSF
    - Flat roof snow load = 24 PSF + drift
    - Drifting snow = as required by ASCE 7-16
- Minimum frost depth = 24 inches below grade
- Soil bearing pressure = As determined by the geotechnical investigation.

LATERAL LOADS

- Wind Loads:
    - Risk Category III
    - The project is not in a high velocity hurricane zone.
    - Wind loads will be established based upon the provisions of ASCE 7-16
    - Use method 2 – Analytical procedure
    - The new buildings in this project are low to mid-rise buildings.
    - Basic wind speed (Vult) = 116 MPH (ultimate)
    - Nominal design wind speed (Vasd) = 89 MPH
    - Internal pressure coefficient (GCpi) = ±0.18
    - The assumed exposure category for the project site is exposure C.
    - Velocity pressure (qh) = varies with height of building
- Seismic Loads:

- Mapped Spectral Response Accelerations: Ss = 0.202 / S1 = 0.065
- Spectral Response Coefficients: Sds = 0.215 / Sd1 = 0.104
- Importance factor (Ie) = 1.25 (Risk Category III)
- Assumed site class D (to be verified by a geotechnical engineer)
- Seismic Design Category B
- Basic Seismic Force-Resisting System and Response Modification Factor (R):
- New 3 to 4 story SUD outpatient building = 3.25 (steel ordinary concentrically braced frames)
- New 2 story SUD inpatient hospital building = 2.00 (ordinary reinforced masonry shear walls)
- New 2 story SUD residential buildings = 6.50 (light-frame (cold-formed steel) walls sheathed with wood structural panels rated for shear resistance)

Mechanical

Building 15 Existing Catawba Hospital

Building 15 is primarily heated and cooled by a 4-pipe fan coil system. Chilled water is generated by a water-cooled modular chiller, and heating hot water is generated by steam-to-water heat exchangers. Air is only exhausted from select locations, such as resident day rooms and recently constructed restrooms. Original restrooms do not have exhaust fans which was typical for this era of buildings.

Building 17 Existing Catawba Hospital Treatment Mall

Building 17 is primarily cooled and heated with two central station variable air volume air handlers and VAV terminal units with hot water reheat coils. VAV boxes with hot water heat modulate airflow and temperature to condition each heating and cooling zone independently of other zones. Some perimeter heating is provided by hot water radiators. Hot water is generated by two separate heat exchanger systems in the basement. The older system serves building 17 radiators, while the newer system provides heating water to building 17 VAV terminal units, and buildings 18, 19, and 20 via buried piping.

Refer to the Existing Conditions Report for information on any building not included herein.

Design Concepts
Building 15

Scope is limited to the connecting corridor only.

Building 17

Upgrades to the treatment mall's interior finishes and added connector to new SUD Inpatient Hospital. Interior finish upgrades to the treatment mall ceiling will include replacement registers, grilles, and diffusers. Any existing wall mounted radiant heating will be replaced.

General Scope

Buildings 1, 2, 18, 19 and 22 are being demolished to allow for installation of the new SUD Inpatient Hospital building. Remove direct buried hot water piping system back to Building 17 crawl space.

SUD Inpatient Hospital
Two-story Option A, 134,490 ft^2, I-2 occupancy.
Two-story Option B, 224,000 ft^2, I-2 occupancy.
Two-story Option C, 224,000 ft^2, I-2 occupancy.

Option A – Inpatient Hospital

Provide six (6) new roof-mounted variable air volume (VAV) air handling units sized for 28,000 CFM each. Air handling units will provide code-required ventilation and utilize chilled and hot water from a new stand-alone central plant described in the following section. Humidification for each air handling unit will be provided by independent propane-fired steam generators and unit-mounted dispersion panels. Air handling units will include the following: 2" thick double wall insulated casing, VAV return or exhaust fan array, exhaust energy recovery, relief air section, Air mixing section with air blender, Prefilter section with 2" MERV-8 prefilters, Hot water preheat coil, steam dispersion panel for humidification, chilled water-cooling coil, and supply fan array. A final filter section with MERV-14 filters will be provided on any air handling unit that serves resident spaces.

4-pipe fan coil units and hot water cabinet heaters will be provided in stairways, vestibules, and other miscellaneous spaces to offset heating and cooling loads. Unit heaters will be used in mechanical and equipment rooms.

Dual chilled water and hot water pumps will be in a first-floor mechanical room to provide chilled and hot water from the central plant primary loops to the air handling units on the roof. The pumps will be selected for N+1 redundancy.

General exhaust fans will be utilized for I-2 spaces requiring exhaust as well as public toilets, individual toilets, locker rooms, etc.

Option B – Inpatient Hospital

Provide 12 new roof-mounted variable air volume (VAV) air handling units sized for 24,000 CFM each. All other features from Option A apply.

Option C – Inpatient Hospital

Provide 12 new roof-mounted variable air volume (VAV) air handling units sized for 24,000 CFM each. All other features from Option A apply.

SUD Outpatient Building
Three-story Option A, Use Group B, 52,000 ft^2.
Three-story Option B, Use Group B, 52,000 ft^2.
Four-story Option C, Use Group B, 70,000 ft^2.

Services offered:

- Level 1: Outpatient Care
- Level 2: Education
- Level 3: Administration/ Support
- Level 4: Shell Space

Option A – SUD Outpatient Building

Provide Three (3) new roof-mounted variable air volume (VAV) air handling units sized for 20,000 CFM each. One (1) Unit Per Floor. Air handling units will provide code-required ventilation and utilize the chilled and hot water from a new stand-alone central plant described in the following section. Humidification for each air handling unit will be provided by stand-alone propane-fired steam generators and unit-mounted dispersion panels. Air handling units will include the following: 2" thick double wall insulated casing, VAV return or exhaust fan array, exhaust energy recovery, relief air section, Air mixing section with air blender, Prefilter section with 2" MERV-8 prefilters, Hot water preheat coil, steam dispersion panel, chilled water-cooling coil, and supply fan array. A final filter section with MERV-14 filters will be provided on any air handling unit that serves resident spaces.

4-pipe fan coil units and hot water cabinet heaters will be provided in stairways, vestibules, and other miscellaneous spaces to offset heating and cooling loads. Unit heaters will be used in mechanical and equipment rooms.

Dual chilled water and hot water pumps will be in a first-floor mechanical room to provide chilled and hot water from the central plant primary loops to the air handling units on the roof. The pumps will be selected for N+1 redundancy.

Option B – SUD Outpatient Building

Provide three (3) new roof-mounted variable air volume (VAV) air handling units sized for 20,000 CFM each. All other features from Option A apply.

Option C – SUD Outpatient Building

Provide three (3) new roof-mounted variable air volume (VAV) air handling units sized for 26,000 CFM each. All other features from Option A apply.

SUD New Residential Buildings

Two-story Option A, 16,000 ft^2 per building, Use Group I-3

- Three (3) Total Buildings, 48,000 ft^2

Two-story Option B, 16,000 ft^2 per building, Use Group I-3

- Four (4) Total Buildings, 64,000 ft^2

Two-story Option C, 16,000 ft^2 per building, Use Group I-3

- Five (5) Total Buildings, 80,000 ft^2

Low-rise multi-family residential, to be constructed for SUD residential residents.

For each residential unit and other heating/cooling zones within the facility provide a blower coil unit installed in a conditioned mechanical room (attic area) above the resident spaces. The blower coils shall have the following features:

- MERV 8 Prefilter
- Chilled Water-Cooling Coil
- Hot Water-Heating Coil.
- Variable Speed Fan for temperature and humidity control.

Provide a DX Dedicated Outdoor Air System (DOAS) with hot gas energy recovery for ventilation air to the building. The DOAS unit shall have an energy recovery wheel for exhaust air from each toilet room. Unit shall deliver dehumidified neutral air to each resident room and all temperature control zones within the Resident buildings.

Provide kitchen range exhaust system. Hood shall be ADA compliant.

Design Criteria

Mechanical design will conform to the design guidelines of all applicable codes and standards of the Authorities Having Jurisdiction (AHJ).

CODES, DESIGN GUIDELINES, AND MATERIAL STANDARDS

- 2021 Virginia Uniform Statewide Building Code
- 2021 Virginia Mechanical Code
- 2021 Virginia Plumbing Code
- 2021 Virginia Energy Conservation Code
- 2021 Virginia Fire Prevention Code
- 2019 NFPA 13 Standards for the Installation of Sprinkler Systems
- 2019 NFPA 72 National Fire Alarm Code
- 2020 NFPA 70 National Electrical Code
- 2012 Life Safety Code Handbook NFPA 101 (Regulated by CMS)
- 2019 NFPA Standards for the Installation of Sprinkler Systems

Guidelines

- NFPA 90A Standard for the Installation of Air Conditioning and Ventilation Systems, 2018 Edition
- 2018 Health Care Facilities Handbook NFPA 99
- SMACNA HVAC Duct Construction Standards: Metal and Flexible 2020, 4th Edition
- ASHRAE Standard 62.1-2019: Ventilation for Acceptable Indoor Air Quality

- ASHRAE Standard 90.1 2016. Energy Standard for Buildings Except Low-Rise Residential Buildings
- 2010 ADA Standards for Accessible Design
- ASHRAE Handbooks and Standards
- Applicable State and Local Ordinances

Additional Resources (SUD Building)

Guidelines for Design and Construction of Hospital and Outpatient Facilities (FGI) 2022 Edition (with current addenda)

a) Including ANSI/ASHRAE/ASHE Standard 170-2021: Ventilation of Health Care Facilities (with current addenda)

Design Guide for the Built Environment of Behavioral Health Facilities 2022

MECHANICAL SYSTEMS

Air Distribution (SUD Inpatient and Outpatient Facilities)

Air distribution from each of the air handling units shall consist of a medium-pressure galvanized duct system serving double wall VAV single-duct terminals equipped with hot water heating coils. Low-pressure ductwork shall convey air from the VAV terminals to ceiling diffusers and/or sidewall supply registers. Supply duct systems shall be fully ducted to ceiling, wall, and floor-mounted air devices.

- Medium pressure ductwork shall be one of the following: Spiral oval ductwork, Spiral round ductwork or TDC flanged rectangular duct.
- All return air shall be ducted and shall be low pressure. Return duct systems shall be fully ducted to ceiling and wall devices.
- All exhaust air shall be ducted and shall be low pressure. Exhaust duct systems shall be fully ducted to ceiling and wall devices.
- All concealed supply and return ductwork shall be externally wrapped with 2.2” thick fiberglass blanket insulation with aluminum skin vapor barrier facing and 0.27 k factor. All exposed supply ductwork shall be externally wrapped with 2.0” thick fiberglass board insulation with aluminum skin vapor barrier facing and 0.23 k factor.
- All supply diffusers, return grilles, and exhaust grilles shall be aluminum construction with a scratch-resistant white powder coating.
- Diffusers, registers, and grilles in spaces accessible to residents shall be ligature resistant and secured in place with temper-resistant fasteners.
- Exhaust systems used for energy recovery shall be insulated as follows: Concealed ductwork shall be externally wrapped with 2.2” thick fiberglass blanket insulation with aluminum skin vapor barrier facing and 0.27 k factor. Ductwork exposed in mechanical rooms and unconditioned spaces shall be externally wrapped with 2.0” thick fiberglass board insulation with aluminum skin vapor barrier facing and 0.23 k factor.
- Exhaust ductwork not used for energy recovery shall be uninsulated except for 10 feet of the duct from the roof deck. Exhaust duct insulation shall be 2.2” thick fiberglass blanket insulation with aluminum skin vapor barrier facing and 0.27 K factor.
- All ductwork openings shall be sealed for shipping and sealed while in construction.
- Exhaust fans for general exhaust service shall be aluminum construction with centrifugal fan wheels, motor operated dampers, and shall be arranged for up-blast discharge.

- Room exhaust not suitable for energy recovery shall be exhausted outdoors through a central exhaust system.
- Supplemental hot water baseboard radiation shall be provided under the windows in waiting areas.
- Computer rooms, security server rooms, and other IT dedicated spaces shall be heated and cooled with independent wall mounted ducted split systems.

Air Handling Units (SUD Inpatient and Outpatient Facilities)

- Custom Air Handling Unit Construction
- 2” thick double wall insulated casings.
- VAV Exhaust fan array section.
- Plate and frame energy recovery section.
- Relief section.
- Air mixing section.
- Fresh air intake.
- 2” MERV 8 pre-filters.
- Air blender section
- Hot water preheat coil section.
- Dual-sloped stainless steel drain pans.
- Humidification Section
- Insulated steam dispersion tubes.
- Dual-sloped stainless steel drain pans.
- Cooling coil section.
- Stainless steel coil casing.
- Dual-sloped stainless steel drain pans.
- Hot water heating section
- Dual-sloped stainless steel drain pans.
- VAV supply fan array section.
- MERV 14 final-filters (When required for patient spaces).
- VAV Terminal Unit Construction
- Double wall solid metal liner system.
- 1” thick R-Value = 4.1
- Capacities ranging from 50 to 4,000 cfm.
- Pressure independent operation.
- Bottom Access Door. (Insulated.)
- Double row heating coil with slip and drive duct connections.
- Multipoint flow sensor.
- The damper blade is constructed of two layers of heavy gauge galvanized steel with peripheral gasket of cross-linked polyurethane foam.
- Plated damper shaft mounted in self-lubricating bearings.

Air Distribution (Residential Buildings)

The air distribution from each blower coil unit shall consist of a low-pressure galvanized duct system serving each heating and cooling zone. Low-pressure ductwork shall convey air to and from the blower coil units to ceiling diffusers and/or sidewall supply registers. Supply duct systems shall be fully ducted to ceiling, wall, and floor-mounted air devices.

- All supply and return air shall be ducted and shall be low pressure. Supply and return

duct systems shall be fully ducted to ceiling and wall devices.

- All exhaust air shall be ducted and shall be low pressure. Exhaust duct systems shall be fully ducted to ceiling and wall devices.
- All concealed supply and return ductwork shall be externally wrapped with 2.2" thick fiberglass blanket insulation with aluminum skin vapor barrier facing and 0.27 k factor. All exposed supply ductwork shall be externally wrapped with 2.0" thick fiberglass board insulation with aluminum skin vapor barrier facing and 0.23 k factor.
- All supply diffusers, return grilles, and exhaust grilles shall be aluminum construction with a scratch-resistant white powder coating.
- Diffusers, registers, and grilles in spaces accessible to residents shall be ligature resistant and secured in place with temper-resistant fasteners.
- Exhaust systems used for energy recovery shall be insulated as follows: Concealed ductwork shall be externally wrapped with 2.2" thick fiberglass blanket insulation with aluminum skin vapor barrier facing and 0.27 k factor. Ductwork exposed in mechanical rooms and unconditioned spaces shall be externally wrapped with 2.0" thick fiberglass board insulation with aluminum skin vapor barrier facing and 0.23 k factor.
- Exhaust ductwork not used for energy recovery shall be uninsulated except for 10 feet of the duct from the roof deck. Exhaust duct insulation shall be 2.2" thick fiberglass blanket insulation with aluminum skin vapor barrier facing and 0.27 K factor.
- All ductwork openings shall be sealed for shipping and sealed while in construction.
- Exhaust fans for general exhaust service shall be aluminum construction with centrifugal fan wheels, motor operated dampers, and shall be arranged for up-blast discharge.
- Room exhaust not suitable for energy recovery shall be exhausted outdoors through a central exhaust system.

Blower Coil Units (Residential Buildings)

- 1" thick double wall insulated casings.
- 2" MERV 8 pre-filters.
- Cooling coil section. (Stainless Steel Casing)
- Stainless steel coil casing.
- Dual-sloped stainless steel drain pans.
- Hot water heating coil. (Stainless Steel Casing)
- Dual-sloped stainless steel drain pans.
- VFD direct drive backward curved plenum supply fans.
- Capacities ranging from 450 to 2,500 cfm.

DOAS Units (Residential Buildings)

- 2" thick double wall insulated casings.
- 2" MERV 8 pre-filters.
- 2" MERV 8 Energy Recovery Filter.
- DX Cooling coil section. (Stainless Steel Casing)
    - Stainless steel coil casing.
    - Hot Gas Reheat for humidity control.
    - Dual-sloped stainless steel drain pans.
- Hot water heating coil. (Stainless Steel Casing)
    - Dual-sloped stainless steel drain pans.
- VFD direct drive backward curved plenum supply and exhaust fans.
- Capacity approximately 800 cfm per residential unit.
- Factory controls.

Controls (All New Buildings)

- The HVAC systems shall be controlled by an expansion of the existing Trane Building Automation System. The BAS controls manufacturer shall provide complete automatic monitoring and control of all HVAC equipment and shall provide a complete web-based graphical user interface package.
- BAS controls shall interface with lighting the lighting control system and can control lighting with a respective buildings schedule.
- BAS controls shall monitor status of domestic water systems, domestic water booster pump, domestic hot water booster pump, and med gas systems.
- Controls shall be capable of monitoring power consumption for each individual AHU, Pump(s), Chiller(s), Cooling Towers(s), Boiler(s), Propane Gas consumption, Heating Hot Water flow in each building, Lighting Panels and Receptacle Panels.
- BAS controls shall be factory installed on the VAV terminals by the terminal manufacturer, and on the AHUs by the AHU manufacturer.
- AHU controls shall include supply air, return air, and outside air airflow stations. (In addition to standard unit controls.)
- DOAS Units shall be monitored by the BAS with operational points written from the BAS to the DOAS units.
- Blower Coils shall be monitored and controlled by the BAS.
- Temperature sensors shall be adjustable and include a display indicating the room temperature.

Hydronic Systems

- Hydronic pumps
- Base-mounted end suction, in-line split coupled centrifugal, or double-suction.
- Selected for N+1 redundancy.
- Variable speed
- Premium efficiency inverter duty motors with Aegis shaft grounding ring
- Suction diffuser.
- High-performance butterfly valves on the suction and discharge sides.
- Stainless steel flex connectors on the suction and discharge sides.
- Check valve on the discharge side.
- Common pressure gauge connected to the suction, discharge, and suction diffuser flange ports via a valve isolation/distribution block.
- Centrifugal water-cooled chillers, N+1 redundancy.
- Variable speed.
- Configured for future expansion.
- Evaporator Entering Water Temperature – 54°F.
- Evaporator Leaving Water Temperature – 38°F.
- ASHRAE 90.1 compliant.
- Marine Condenser water box.

Cooling Towers

- N+1 redundancy
- Configured for future expansion.
- Entering Water Temperature – 95°F
- Leaving Water Temperature – 85°F
- Wet Bulb Temperature – 79.7°F
- Bottom Equalizer connections

- Premium Efficiency Motor
- Variable Frequency Drive Service
- Mechanical vibration cutout switch
- Electric immersion heaters
- Stainless Steel Basin
- Basin Weir Dams
- Fiberglass Reinforced Polyester Casing Panels
- Fiberglass Reinforced Polyester Air Inlet Louvers
- PVC Fill & Drift Eliminators
- Ultrasonic level control system, control valve, level controller
- Plenum Access Doors
- Fan Deck and Ladder with Handrails and Safety Gate
- Louver Face External Platforms
- Access Door Platforms
- Stainless Steel Internal Walkway
- Internal ladder and service platform

Chilled Water System Ancillary Equipment

- Variable speed centrifugal chillers with free cooling
- Air Separator
- Expansion Tank(s) Bladder Style
- One tank each for chilled and condenser water systems.
- Cooling Tower Chemical Treatment System: Shot feeder.
- 12 Pulse Variable Frequency Drives for all Pumps and cooling tower fans.
- All VFD's shall have bypass switches.
- All VFD's shall have communication cards for communication with the BAS.
- All VFD's shall have line reactors and line filters.
- All VFD motors shall be premium efficiency inverter duty with Aegis Shaft Grounding Ring
- Refrigerant monitoring system with sensor at each chiller
- Exhaust fans and motor operated louvers for general space ventilation.
- Refrigerant evacuation system
- Exhaust fan and ductwork with exhaust grilles mounted 12" above finished floor.
- One exhaust duct drop per chiller.
- Constant volume air handling unit for room heating and cooling in the mechanical room with distribution ductwork and high induction diffusers.
- Chilled water plant control system with optimization control programming logic
- Propane Fired condensing heating hot water boilers, N+1 Redundancy.
- Independently vented.
- Configured for future expansion.
- Heating water System Ancillary Equipment
- Air Separator -- Expansion Tank(s) Bladder Style
- Shot feeder.
- 12 Pule Variable Frequency Drives for all Pumps
- All VFD's shall have bypass switches.
- All VFD's shall have communication cards for communication with the BAS.
- All VFD's shall have line reactors and line filters.
- All VFD motors shall be premium efficiency inverter duty with Aegis Shaft Grounding

Ring

- Exhaust fans and motor-operated louvers for general space ventilation.

Piping Schedule

SYSTEM	*PRESSURE (PSIG)*	*PIPE SIZE*	*MATERIAL*	*PIPE SCHEDULE*	*FITTINGS*
HEATING HOT WATER	100	¾" to 2"	Copper	Type L	Wrought Copper
HEATING HOT WATER	100	2-½" to 14"	Black Steel	40	Weld
CHILLED WATER	100	¾" to 2"	Copper	Type L	Wrought Copper
CHILLED WATER	100	2-½" to 24"	Black Steel	40	Weld
LIQUID PROPANE	0 – 5	¾" to 2"	Black Steel	40	Malleable Threaded Class 150
LIQUID PROPANE	0 – 5	2-½" to 14"	Black Steel	40	Weld
LOW PRESSURE STEAM	0-25	¾" to 2"	Black Steel	40	Malleable Threaded Class 150
LOW PRESSURE STEAM	0-25	2-½" to 14"	Black Steel	40	Weld
STEAM CONDENSATE LOW PRESSURE	0-25	¾" to 2"	Black Steel	80	Malleable Threaded Class 150
STEAM CONDENSATE LOW PRESSURE	0-25	2-½" to 14"	Black Steel	80	Weld
AHU DRAIN PAN PIPING	-	¾" to 3"	Copper	Type L	Wrought Copper
MAKEUP WATER	-	¾" to 3"	Copper	Type L	Wrought Copper
CONDENSER WATER	100	¾" to 2"	Copper	Type L	Wrought Copper
CONDENSER WATER	100	2-½" to 24"	Black Steel	40	Weld

Direct buried district piping between the chilled and hot water plants and the adjacent buildings shall be a polypropylene piping system confirming to ASTM F 2389-21.

Hydronic valves

Chilled, Heating, and Condenser Water

- Shut-off Duty
- 1/2" to 2" pipe Size: two-piece bronze Ball valve with stainless steel trim, PTFE seats
- 2-1/2" and larger pipe size: High-performance butterfly valve, lug type, suitable for bidirectional dead-end service at rated pressure without use of downstream flange.

Makeup water

- ½" to 2" pipe size: two-piece bronze Ball valve with stainless steel trim, PTFE seats
- 2-1/2" and larger pipe size: High-performance butterfly valve, lug type, suitable for bidirectional dead-end service at rated pressure without use of downstream flange.

Steam and condensate:

- 1/2" to 2" pipe Size: two-piece bronze Ball valve with stainless steel trim, PTFE seats

Piping Insulation

Heating hot water supply and return

- Insulation Type: Fiberglass
- Indoor Finish and jacket: All service jacket with self-sealing lap
- Outdoor Finish and jacket: All service jacket with self-sealing lap, and aluminum jacket, stucco embossed.
- 1/2” to 1-1/4” pipe: 1-1/2” insulation thickness
- 2” pipe and larger: 2” insulation thickness

Direct Buried heating hot water supply and return

- Insulation Type: Cellular Glass
- Finish and jacket: Heat sealing jacket specifically designed for burial applications.
- All pipe sizes: 1” insulation thickness

Chilled water supply and return

- Insulation Type: Fiberglass
- Indoor Finish: All service jacket with self-sealing lap
- Outdoor Finish: All service jacket with self-sealing lap, and aluminum jacket, stucco embossed.
- 1/2” to 1-1/4” pipe: 1” insulation thickness
- 2” pipe and larger: 1-1/2” insulation thickness

Low-pressure steam and condensate

- Insulation Type: Fiberglass
- Indoor Finish: All service jacket with self-sealing lap
- Outdoor Finish: All service jacket with self-sealing lap, and aluminum jacket, stucco embossed.
- 1/2” to 1-1/4” pipe: 2” insulation thickness
- 2” pipe and larger: 2-1/2” insulation thickness

Condenser Water Supply and Return

- Insulation Type: Fiberglass
- Indoor Finish: All service jacket with self-sealing lap
- Outdoor Finish: All service jacket with self-sealing lap, and aluminum jacket, stucco embossed.
- 1/2” to 3/4” pipe: 1” insulation thickness
- 1” pipe and larger: 1-1/2” insulation thickness

Makeup water

- Insulation Type: Fiberglass
- Indoor Finish: All service jacket with self-sealing lap
- Outdoor Finish: All service jacket with self-sealing lap, and aluminum jacket, stucco embossed.
- 1/2” insulation thickness

AHU drain piping, outdoor

- Insulation Type: Fiberglass
- Indoor Finish: All service jacket with a self-sealing lap
- Outdoor Finish: All service jacket with self-sealing lap, and aluminum jacket, stucco embossed.
- 1/2” insulation thickness
- 2” pipe and larger: 1-1/2” insulation thickness

CENTRAL PLANT

General Description:
The heating and cooling plants for the new facilities shall be stand alone. The two plants shall be included in a single structure and separated by a floor-to-deck wall. Both heating and cooling plants shall be no less than 3,000 square feet each.

The chilled water plant shall be sized to provide 1 ton of cooling for every 225 square feet of new construction and configured for N+1 redundancy where N is the number is chillers needed to meet the total cooling demand. The capacity of the redundant standby chiller will match the capacity of the largest standby chiller. All plant components, condensers, chilled water piping and controls will be sized and selected to match the N+1 requirement.

One primary variable speed pump will be provided for each chiller. All pumps will be manifolded together, so any pump can provide full flow to any chiller.

Heating water is provided by fully condensing propane-fired boilers. Each boiler will have a dedicated, factory-fabricated double-wall stainless steel flue vent system. Combustion air shall be provided direct from the outside via ductwork. The boiler plant will be configured for N+1 redundancy.

One variable speed pump will be provided for each boiler. All pumps will be manifolded together so any pump can provide full flow to any chiller.

Piping shall be distributed from the central plant via direct buried piping. The direct buried piping shall include a supply branch to building 15 and sized to replace the existing chilled water plant in building 15 plus an additional 15 percent for future load.

The central plant and distribution piping shall be constructed so that both cooling and heating plants can be expanded to include the heating and cooling loads for buildings 15, 16, 17, and 73, plus an additional 15 percent for a future load, and maintain N+1 redundancy.

All piping mains shall be sized for current and future plant needs.

All expansion tanks shall be sized for current and future needs.

A refrigerant management ventilation system will be provided.

Ventilation fans will be provided in both the boiler and chiller plants for free cooling when available.

Blower coils will be utilized for heating and cooling when free cooling is not available.

Chemical treatment for condenser, chilled, and heating hot water will be provided.

A parallel backflow preventer arrangement shall be provided leaving one backflow preventer for redundancy.

Floor drains will be provided at:

Chillers
Boilers
Pumps
Cooling towers
Backflow preventers

Chiller Water Plant:

Option A: Three (3) 600-ton centrifugal chillers.
Option B: Four (4) 600-ton centrifugal chillers.
Option C: Two (2) 1000-ton centrifugal chillers, and two (2) 800-ton centrifugal chillers.

Heating Hot Water Plant

Option A: Five (5) 2,500 MBH condensing boilers.
Option B: Seven (7) 2,500 MBH condensing boilers.
Option C: Eight (8) 2,500 MBH condensing boilers.

CENTRAL PLANT PROPANE TANK SYSTEM

A propane storage system consisting of four 20,000-gallon tanks will be provided to serve the new central plant heating hot water system. The tanks shall connect to dual propane lines serving the boiler plant to provide redundancy.

Piping shall be schedule 40 steel with welded or threaded fittings, all valves used in the gas piping shall be UL rated for gas service.

Dual independent vaporizing systems shall be provided to vaporize propane during cold weather.

Electrical

Existing Structures

BUILDING 15 EXISITING CATAWBA HOSPITAL

The existing facility normal power services are fed from three (3) individual disconnects. The switchboards are labeled as 'MDP-1'(2of3), 'MDP-2'(2of3), 'MDP-3'(1of3) and 'MDP-1' Bldg. 16. The switchboards are in the Basement of Building 15 and the Loading Dock area of Building 16. Switchboard 'MDP-1' Bldg. 15 is Westinghouse Panelboard, 800A, 480/277V, 3Phase, 4Wire. Switchboard 'MDP-2' Bldg. 15 is Westinghouse Panelboard, 800A, 480/277V, 3Phase, 4Wire. Switchboard 'MDP-3' Bldg. 15 is Siemens, 1600A, 208/120V, 3Phase, 4Wire.

The existing facility emergency power services are fed by two 500kW Generac generators. The generators are labeled as 'Generator A' and 'Generator B.' The generators are fed with #2 Fuel Oil via local belly tank. The mass storage tank has a capacity of 4,000 gallons. The generators and day tanks are in an exterior utility yard. Generator 'A' is Generac, 500kW/625kVA, 750A Output, 480/277V, 3Phase, 4Wire. Generator 'B' is Generac, 500kW/625kVA, 750A Output, 480/277V, 3Phase, 4Wire. The two generators feed one Switchboard. The Switchboard is labeled as 'EDPH.' The paralleling switchboard is in the Basement of Building 15. The Switchboard 'EDPH' is EATON Cutler-Hammer Pow-R-Line C, 2000A, 480/277V, 3Phase, 4Wire. The Switchboard feeds a Transformer that feeds Switchboard 'EDPL' Switchboard 'EDPL' is EATON Cutler-Hammer Pow-R-Line C, 1600A, 208/120V, 3Phase, 4Wire.

There is one (1) 480/277V switchboard responsible for providing emergency power to the two (2) existing automatic transfer switches for the facility. There is one (1) 208/120V switchboard providing emergency power to four (4) existing automatic transfer switches for the facility. All automatic transfer switches are in the basement of Building 15. 'ATS-1' is ASCO Power Technologies 7000 Series Automatic Transfer Switch, 400A, 208/120V, 3Phase, 4Wire. 'ATS-2' is ASCO Power Technologies 7000 Series Automatic Transfer Switch, 400A, 208/120V, 3Phase, 4Wire. 'ATS-3' is ASCO Power Technologies 7000 Series Automatic Transfer Switch, 400A, 208/120V, 3Phase, 4Wire. 'ATS-4' is ASCO Power Technologies 7000 Series Automatic Transfer Switch, 800A, 208/120V, 3Phase, 4Wire. 'ATS-5' is ASCO Power Technologies 7000 Series Automatic Transfer Switch, 800A, 480/277V, 3Phase, 4Wire. 'ATS-6' is ASCO Power Technologies 7000 Series Automatic Transfer Switch, 1000A, 208/120V, 3Phase, 4Wire.

BUILDING 17 EXISTING CATAWBA HOSPITAL TREATMENT MALL

The existing facility normal power service is fed by one (1) panel labeled Panel 'MAIN' (Unmarked). The panel is FPE FDP-BDP Panelboard, 800A, 240/120V, 3Phase, 4Wire.

Design Concepts

Electrical design will conform with the design guidelines of Option A, B and C

Building 15 Existing Catawba Hospital
No electrical work is anticipated.

Building 17 Existing Catawba Hospital Treatment Mall

Floors 1 only finish upgrades to existing treatment mall. Finishes will likely include replacement light fixtures and exit signage.

Buildings 1, 2, 18, 19 and 22 are being demolished to allow for installation of the new Acute Adult Behavioral building. Remove all electrical services, equipment, and devices.

SUD Inpatient Hospital with Connector to Building 17
Provide wiring devices, equipment, light fixtures, nurse call devices, fire alarm devices, access control devices, and telecommunications as required to meet project programming and applicable codes.

One (1) 480Volt/3PH/60Hz 5,000-amp electrical service is anticipated.

- Provide two (2) new normal power switchgears.
- Provide one (1) new emergency power switchgear.
- Provide two (2) new emergency power generators.
- Provide five (5) new automatic closed transition bypass isolation transfer switches.
- Provide normal power and emergency power branch circuit distribution.

Electrical capacity shall be provided for the full program of Option C.

SUD Outpatient Facility with Connector to Building 15

Provide wiring devices, equipment, light fixtures, fire alarm devices, access control devices, and telecommunications as required to meet project programming and applicable codes.

One (1) 480Volt/3PH/60Hz 3,000-amp electrical service is anticipated.

- Provide one (1) new normal power switchboard.
- Provide one (1) new emergency power switchboard.
- Provide one (1) new emergency power generator.
- Provide three (3) new automatic closed transition transfer switches.
- Provide normal power and emergency power branch circuit distribution.

Electrical capacity shall be provided for the full program of Option C.

SUD Residential Housing (Per Unit)

Provide wiring devices, equipment, light fixtures, fire alarm devices, access control devices, and telecommunications as required to meet project programming and applicable codes.

One (1) 480Volt/3PH/60Hz 750-amp electrical service is anticipated. (Per Building)

- Provide one (1) 480Volt/3PH/60Hz generator to serve the full program of Option C.
- Provide one (1) new normal power distribution board.
- Provide one (1) new emergency power distribution board.
- Provide one (1) new emergency power distribution board.
- Provide three (3) new automatic closed transition transfer switches.
- Provide normal power and emergency power branch circuit distribution.

Design Criteria

Codes, Design Guidelines, and Material Standards

- 2021 Virginia Uniform Statewide Building Code
- 2021 Virginia Mechanical Code
- 2021 Virginia Plumbing Code
- 2021 Virginia Energy Conservation Code
- 2021 Virginia Fire Prevention Code
- 2019 NFPA 13 Standards for the Installation of Sprinkler Systems
- 2019 NFPA 72 National Fire Alarm Code
- 2020 NFPA 70 National Electrical Code
- 2012 Life Safety Code Handbook NFPA 101 (Regulated by CMS)
- 2019 NFPA Standards for the Installation of Sprinkler Systems

Guidelines

- 2018 Health Care Facilities Handbook NFPA 99
- ASHRAE Standard 90.1 2016. Energy Standard for Buildings Except Low-Rise Residential Buildings
- 2010 ADA Standards for Accessible Design
- Applicable State and Local Ordinances

Additional Resources (SUD Building)

- Guidelines for Design and Construction of Hospital and Outpatient Facilities (FGI) 2022 Edition (with current addenda)
- Design Guide for the Built Environment of Behavioral Health Facilities 2022

Material Standards

General Design Conditions and Power

- Conductors for feeders shall be sized to prevent a voltage drop exceeding two percent. Conductors for branch circuits shall be sized to prevent a voltage drop exceeding three percent at the farthest point of power, lighting, heating, or combination of such loads. The maximum voltage drops of both a feeder and branch circuit to the farthest point shall not exceed 5 percent.
- All conductors shall be copper THWN/THHN. The minimum wire size shall be #12AWG.
- All feeders and branch circuits for both normal power and emergency power systems shall be single conductors in the raceway.
- All branch circuits shall be provided with a dedicated neutral.
- Interior raceways shall be EMT (Electrical Metallic Tubing) unless exposed to physical damage then raceways shall be RMC (Rigid Metal Conduit). The minimum raceway size shall be 3/4”. All fittings and couplings for EMT shall be steel set screw. All fittings and couplings for RMC shall be threaded.
- Exterior raceways above ground shall be RMC (Rigid Metal Conduit). Exterior raceways below ground shall be Schedule 40 PVC (Polyvinyl Chloride). The minimum raceway size shall be 3/4”. All fittings and couplings for RMC shall be threaded.
- Receptacles shall be 20A hospital grade type receptacles. Receptacles in waiting areas, corridors, and all public spaces shall be tamper resistant. Receptacles in waiting areas and break rooms shall also be receptacles with USB charging ports.
- All wiring devices connected to emergency power shall be factory finished red in color.
- All device cover plates shall be stainless steel and engraved with the panel name and circuit number.
- All distribution equipment such as transfer switches, switchboards, panels, transformers, disconnects, and all other distribution equipment shall be provided with a self-adhesive engraved identification nameplate.
- Provide concrete housekeeping pads under all new floor mounted distribution equipment.
- New distribution equipment shall be manufactured by GE, Siemens, or Square-D.
- All devices and equipment within resident care spaces shall be anti-ligature.
- Telecommunications and low-voltage system outlets shall be provided with a backbox and 3/4" empty conduit with pull string to the accessible ceiling space.

Lighting

- All interior spaces shall be provided with lighting fixtures designed to enhance the aesthetics and to provide illumination level consistent with the current standards as defined by the Illuminating Engineering Society of North America (IESNA) Handbook.
- Lighting fixtures shall utilize energy efficient LED type light sources. LED sources shall have a minimum color rendering index (CRI) of 90 and a color temperature of 3,500 Kelvin. All LED lighting shall be tunable white.
- Exit lights shall be internally lit LED. Exit lights shall be a decorative type of edge lit exit light and shall have red colored letters.
- Switches shall be provided in all spaces to control the light fixtures within that space.
- Provide dimming capabilities in resident care spaces, conference rooms, meeting spaces, and any other areas required by administrative needs.
- Vacancy and Occupancy sensors shall be provided in public spaces, toilet rooms, storage rooms, offices, and any other spaces as required by the International Energy Conservation Code.
- Emergency life safety power lighting shall be provided in all egress paths such as corridors, stairs, etc.
- All lighting in resident care spaces shall be anti-ligature.
- Provide light fixtures as required to meet recommended lighting levels from the IESNA Handbook.
- Descriptions of the types of fixtures in each are of the project area as follows:
- Interior Specialty Areas – Specialty lighting areas include the main entry and other areas as designated by the architect and interior designer. These areas will include LED dimmable recessed down-lights, and interior designer-selected LED pendants and wall sconces.
- Interior Typical Areas – Typical common space areas, offices, corridors, conference room, etc. throughout the building will be lighted with LED direct/indirect lay-in 2x2 fixtures. LED dimmable recessed down-lights will be used at nurse stations, waiting rooms, quiet rooms, consultation rooms, and other spaces where lighting levels will need to be adjusted.
- Clean Room Spaces – LED direct lensed clean room gasketed lay-in 2x2 fixtures. Lenses shall be inverted to have smooth face down.
- Storage Spaces – LED direct lensed lay-in 2x2 fixtures.
- Restrooms – LED vanity wall mounted sconce and LED dimmable recessed down-light.
- Emergency Egress – Wall/Ceiling mounted LED exit sign.

Other Equipment

- Security, CCTV, card readers, wave sensors, panic stations, and automatic doors as required for access control.
- Nurse Call System: Restrooms, resident rooms, corridors, nurse stations, staff areas, and all other areas for a complete system as required by Code and Guidelines.

Fire Alarm

Provide new fire alarm devices as required by NFPA 72. Notification appliances shall be provided in all public spaces such as toilets, corridors, waiting areas, etc. Smoke detection shall be provided in all public spaces such as toilets, corridors, waiting areas along with storage rooms, utility rooms, etc. Provide pull stations at exit doors, nurse stations, and in corridors as required by travel distance. A remote Fire alarm annunciator shall be provided at the nurse stations. Provide devices locations per NFPA 72. The fire alarm system shall be interfaced with mechanical systems as required to shut down fans and air handling units or close smoke dampers. The fire alarm system will be interfaced with door hold open devices and the proposed horizontally sliding fire barrier doors. The new fire alarm system wiring shall be concealed in EMT and rated as required by NFPA 72 and IBC.

Lightning Protection

- Provide lightning protection system to accommodate any new buildings or roof mounted equipment and certify in accordance with NFPA 78 and UL 96.

Site Utility Systems

SUD Inpatient Facility with Connector to Building 17

- Provide new site lighting for the parking lot. Poles shall be approximately 30’ in height mounted to a concrete base. Site lighting shall be provided to allow for an average footcandle level of 1fc. Provide central timeclock and photocell control. Provide motion sensor control at each fixture.

SUD Outpatient Facility with Connector to Building 15

- Provide new site lighting for the parking lot. Poles shall be approximately 30’ in height mounted to a concrete base. Site lighting shall be provided to allow for an average footcandle level of 1fc. Provide central timeclock and photocell control. Provide motion sensor control at each fixture.

SUD Residential Housing (Per Unit)

- Provide new site lighting for the parking lot. Poles shall be approximately 30’ in height mounted to a concrete base. Site lighting shall be provided to allow for an average footcandle level of 1fc. Provide central timeclock and photocell control. Provide motion sensor control at each fixture.

Central Plant

- The heating and cooling plants for the new Adult Behavioral and Outpatient Education and Research buildings shall be stand-alone and adjacent to the Adult Behavioral building. The two plants shall be included in a single structure and separated by a floor-to-deck wall. Both heating and cooling plants shall be no less than 3,000 square feet each.

Option A, B, or C (Planned for future expansion)

Chilled Water Plant and Boiler Plant

Provide wiring devices, equipment, light fixtures, fire alarm devices, access control devices, and telecommunications as required to meet project programming and applicable codes.

Anticipated service size for the chilled water plant – two (2) 480Volt/3PH/60Hz 5,000-amp electrical services

Provide one (1) new normal power switchboard.

Provide one (1) new emergency power switchboard.

Provide one (1) new emergency power generator.

Provide three (3) new automatic closed transition transfer switches.

Provide normal power and emergency power branch circuit distribution.

Provide new site lighting for the parking lot. Poles shall be approximately 30’ in height mounted to a concrete base. Site lighting shall be provided to allow for an average footcandle level of 1fc. Provide central timeclock and photocell control. Provide motion sensor control at each fixture.

Plumbing

Existing Structures

BUILDING 15

Building 15 is served by a 4" ductile iron domestic cold-water pipe. A backflow preventer is present, but is not in working order, nor has it been recently inspected. Incoming water pressures were read at 87 psi, and 80 psi downstream of the backflow preventer. Domestic water distribution piping is a combination of galvanized threaded piping and copper.

Domestic hot water service is provided by two steam-to-hot-water shell-and-tube heat exchangers. Each heat exchanger has its own thermostatic mixing valve. These manual valves are scheduled to be swapped out with electronic automatic actuated ASSE 1017 mixing valves (per discussions with maintenance staff). The heaters output 150°F to 160°F water, and the mixing valves blend the domestic hot water distribution down to 120°F.

Domestic hot water recirculation is present in this building via a single in-line pump, which is relatively new. Multiple sets of domestic water, sanitary, and vent risers extend from the basement, behind the stacked bathrooms in accessible chases to serve fixtures on all 8 floors.

There is a commercial water softening system that serves the domestic hot water heating system.

Sanitary service is threaded iron piping. Some sanitary piping in plumbing chases has been replaced with PVC during past projects.

Storm drainage is achieved via piped roof drains as primary, and overflow scuppers as secondary.

A new air compressor in the basement provides compressed air to for pneumatic HVAC system controls. The compressor is less than 1 year old. Additionally, there is an old backup compressor not currently in use.

Each resident floor has multiple resident rooms, and staff toilet rooms. The resident toilets have wall mounted porcelain water closets with external flush valves, with enclosed flush valve covers intended for ligature resistance. Lavatories are solid surface or porcelain and ligature resistant type fixtures. Showers fixtures are tile in place or pre-manufactured shower pans with ligature resistant stainless-steel panels with safety controls and outlets.

The staff toilet room fixtures are wall mounted porcelain. Toilets have exposed flush valves. Lavatories are wall mounted with exposed manual gooseneck faucets. Staff break room areas have stainless-steel drop-in sinks with single handle faucets, consistent with residential type kitchens.

The plumbing systems in Building 15 are in working order, but show significant signs of aging, wear and tear, and exterior corrosion. Piping within the plumbing chases is of various quality and life and is recommended for replacement with any significant renovation to the building.

The domestic hot water heat exchangers are of sufficient size and show similar signs of aging. The domestic hot water recirculation pump, while like new, is undersized and insufficient for an 8-floor building recirculation loop. The entire domestic hot water system should be rebalanced to ensure 109°F water is achievable for public handwashing on the top floor.

Some plumbing fixtures on the resident floors are in a new condition, while others are old and are recommended for replacement as a part of any future projects.

BUILDING 17

Building 17 is served by a 2" domestic cold-water feed. No backflow preventer is present. An electric tank water heater serves the building. Domestic hot water recirculation is present in this building. No master mixing valve was observed. Sanitary service is a combination of PVC DWV and threaded iron piping. Domestic water piping is a combination of threaded galvanized piping and copper. The roof is drained via gutters and external downspouts. Plumbing fixtures in resident areas are ligature resistant type consistent with those found in building 15. Staff areas have wall hung porcelain fixtures that are not ligature resistant. The condition of the existing plumbing systems is poor, including pipe corrosion, missing or damaged insulation, and hard water deposits.

Design Concepts

Building 15 Existing Catawba Hospital

No plumbing work is anticipated.

Building 17 Existing Catawba Hospital Treatment Mall

Finishes upgrade only. Anticipated work could include electric water coolers and fixtures in public restrooms.

Buildings 1, 2, 18, 19 and 22 are being demolished to allow for installation of the new Acute Adult Behavioral building. Remove all electrical services, equipment, and devices.

SUD Inpatient Facility with Connector to Building 17

Two-story Option A, 134.490 ft^2, I-2 occupancy.

- New 8” sanitary connection to site utilities.
- New storm water connection to site, sized per IPC and local rainfall rates.
- New 6” domestic cold water main to serve the new building with redundant backflow preventers.
- Propane fired condensing boilers will provide domestic hot water, with dedicated recirculation pump(s).
- A central water softening system.
- New resident areas will have ligature resistant safety type fixtures.
- Staff areas will have standard commercial type healthcare plumbing fixtures.
- Medical Vacuum Equipment and Piping and Instrument Air Equipment and Piping will be required for Dental services.

Two-story Option B, 224,000 ft^2, I-2 occupancy.

- New 10” sanitary connection to site utilities.
- New storm water connection to site, sized per IPC and local rainfall rates.
- New 8” domestic cold water main to serve the new building with redundant backflow preventers.
- Propane fired condensing boilers will provide domestic hot water, with dedicated recirculation pump(s).
- A central water softening system.
- New resident areas will have ligature resistant safety type fixtures.
- Staff areas will have standard commercial type healthcare plumbing fixtures.
- Medical Vacuum Equipment and Piping and Instrument Air Equipment and Piping will be required for Dental services.

Two-story Option C, 224,000 ft^2, I-2 occupancy.

- New 12” sanitary connection to site utilities.
- New storm water connection to site, sized per IPC and local rainfall rates.
- New 8” domestic cold water main to serve the new building with redundant backflow preventers.
- Propane fired condensing boilers will provide domestic hot water, with dedicated recirculation pump(s).
- A central water softening system.
- New resident areas will have ligature resistant safety type fixtures.
- Staff areas will have standard commercial type healthcare plumbing fixtures.

- Medical Vacuum Equipment and Piping and Instrument Air Equipment and Piping will be required for Dental services.

SUD Outpatient Facility with Connector to Building 15

Three-story Option A, Business Occupancy, 52,000 ft^2.

- New 6” sanitary connection to site utilities.
- New storm water connection to site, sized per IPC and local rainfall rates.
- New 4” domestic cold water main to serve the new building with redundant backflow preventers.
- Propane fired condensing boilers will provide domestic hot water, with dedicated recirculation pump(s).
- A central water softening system.
- New resident areas will have ligature resistant safety type fixtures.
- Staff areas will have standard commercial type healthcare plumbing fixtures.

Three-story Option B, Business Occupancy, 52,000 ft^2.

- Same as option A.

Three-story Option C, Business Occupancy, 70,000 ft^2.

- Same as option A.

Design Criteria

Plumbing design will conform to the design guidelines of all applicable codes and standards of the Authorities Having Jurisdiction (AHJ).

CODES, DESIGN GUIDELINES, AND MATERIAL STANDARDS

- 2021 Virginia Uniform Statewide Building Code
- 2021 Virginia Mechanical Code
- 2021 Virginia Plumbing Code
- 2021 Virginia Energy Conservation Code
- 2021 Virginia Fire Prevention Code
- 2019 NFPA 13 Standards for the Installation of Sprinkler Systems
- 2019 NFPA 72 National Fire Alarm Code
- 2020 NFPA 70 National Electrical Code
- 2012 Life Safety Code Handbook NFPA 101 (Regulated by CMS)
- 2019 NFPA Standards for the Installation of Sprinkler Systems

Guidelines

- 2018 Health Care Facilities Handbook NFPA 99
- ASHRAE Standard 90.1 2016. Energy Standard for Buildings Except Low-Rise Residential Buildings
- 2010 ADA Standards for Accessible Design
- Applicable State and Local Ordinances

Additional Resources (SUD Building)

Guidelines for Design and Construction of Hospital and Outpatient Facilities (FGI) 2022 Edition (with current addenda)

Design Guide for the Built Environment of Behavioral Health Facilities 2022

SITE UTILITY SYSTEMS

Rainwater reclamation systems

SUD INPATIENT FACILITY WITH CONNECTOR TO BUILDING 17

- Underwater storage tank(s) with bypass to site.
- Water treatment equipment inside the building(s).
- Gray water distribution system
- Used for toilet flushing or other code compliant gray water applications.

SUD OUTPATIENT FACILITY WITH CONNECTOR TO BUILDING 15

- Underwater storage tank(s) with bypass to site.
- Water treatment equipment inside the building(s).
- Gray water distribution system
- Used for toilet flushing or other code compliant gray water applications.

PLUMBING SYSTEMS MATERIALS AND SPECIFICATIONS

All new building plumbing utilities and renovated existing plumbing systems shall comply with the following standards.

Domestic Cold water

- DCW main shall serve each new facility from a new tap into the utility.
- Service entrance with isolation valve and protected with two parallel duplex RPZ backflow preventers.
- The distribution system shall consist of ductile iron piping for sizes 4” and larger from building entry to the backflow preventer(s).
- The distribution system for brine shall consist of SCH 80 CPVC piping.
- Freezeproof hydrants will be provided every 150’ along the building perimeter for convenience and on the roof as required to service mechanical equipment.
- Provide full port lead free ball valves for pipe sizes 3” and smaller and high performance (Bray Series 41 or equivalent bubble tight shutoff) butterfly valves for piping 4” and larger.
- All components shall meet lead free requirements.
- Water Softener
- Triplex water softener to serve DCW, DHW, and mechanical makeup systems.
- External brine tanks adjacent to water softener system.

Domestic Hot Water

- DHW is to be provided by two propane fired condensing boilers. Size dependent on option chosen.

- The water temperature will be set at or above 140F to mitigate legionella concerns within DHW generation equipment.
- Mixing valves noted below will mix down to required distribution temperatures.
- One electronic controlled master mixing valve sized for the new 120F DHW flow.
- One electronic controlled master mixing valve sized for Kitchen/Servery 140F DHW flow.
- Point of use mixing valves on all public sinks and lavatories as required by IPC.
- The distribution system shall consist of type L copper for sizes 3" and less.
- The distribution system for domestic water shall consist of Schedule 10 Stainless steel with welded joints for sizes 4" and greater.
- Provide full port ball valves for pipe sizes 3" and smaller and high-performance butterfly valves for piping 4" and larger.
- Two recirculation pumps for hot water return.
- 120F loop
- 140F loop
- Automatic flow controls in hot water return system to allow balancing. Recirculated DHW sources must be available within 25' (total developed length of piping, including vertical offsets) as required by FGI, for each connected fixture.
- A floor mounted ASME rated Expansion tank.
- All components shall meet lead free requirements.

Plumbing Fixtures

Resident Areas

- Ligature-resistant safety type fixtures throughout
- Fixtures will be ADA when required.
- Bathrooms and toilets shall all meet ADA and water closets will be wall mounted wall outlet throughout.
- Fixtures and trim shall meet lead free requirements.
- Stainless steel or powder coated Water Closets
- 1.6 gpf flushometer – concealed within wall space – accessible only by staff.
- Wall mounted, wall inlet, wall outlet.
- Stainless steel, powder coated, or solid surface lavatories –automatic or manual faucets – ligature resistant.
- Single and group occupant toilets
- Showers
- Tile in place or solid surface pre-manufactured shower systems.
- ADA compliant controls
- Two shower heads, 1 at standing height and 1 at ADA compliant height
- Two sets of shower controls
- All controls, heads, and accessories will be ligature resistant.

Staff and public areas

- Bathrooms and toilets shall all meet ADA and water closets will be floor mounted back outlet throughout.

- Fixtures and trim shall meet lead free requirements.
- Vitreous China Water Closets – 1.1/1.6 gpf dual acting flushometer.
- Vitreous China Clinical Service Sinks– 1.1/1.6 gpf dual acting flushometer.
- Soiled Utility Rooms
- Floor mounted on 10” terrazzo pedestal.
- Wall mounted wrist blade operated faucet.
- Wall mounted spray hose with foot pedal operation
- Vitreous China Urinals – Pint flush electronic flushometer
- Vitreous China Lavatories –faucets
- Single occupant toilets
- Point of use mixing valve under each wall mount lavatory (public only)
- Public areas electronic faucets
- Clinical areas 4: wrist blade handle operation
- Faucets in public areas shall have goosenecks with 0.5 gpm non-aerating flow controls.
- Faucets in clinical spaces shall utilize flow controls within the gooseneck, 1.5 gpm laminar flow plain end outlets without aerators.
- Stainless Steel drop-in Lavatories and sinks– 1.5 gpm faucets
- Exam Rooms (these may require higher flows)
- Public areas: wrist blade handle operation
- Clinical areas: wrist blade handle operation
- Staff break room sinks to include side spray.
- Faucets in clinical spaces shall utilize flow control in the gooseneck, 1.5 gpm laminar flow plain end outlets without aerators.
- Mop sinks – Cast Concrete and marble with stainless steel rim.
- Include faucet, hose, mop hanger.
- Staff Showers (ADA roll-in style)
- 1.5 gpm handheld shower wand
- Mixing valve
- Handrails
- Eye Washes
- As required. Included mixing valves from manufacturer.

Sanitary

Sanitary will be collected by a series of 6” building drains that connect to the utilities outside of the structure.

- Sanitary waste and vent piping will be connected to each plumbing fixture requiring waste.
- Below grade sanitary and vent piping shall consist of PVC DWV pattern.
- Above grade sanitary and vent piping shall consist of no-hub cast iron.

Floor Drains with trap primers will be provided in:

- Mechanical rooms (4”)
- Public toilets (2”)

- Individual toilets (2”)
- Janitor’s / EVS closets. (3”)

Grease Waste

- Only required if the new building contains a commercial kitchen.
- Cast iron piping from drain connections serving 3rd floor kitchen to grease interceptor.
- See Sanitary piping for 4” piping beyond interceptor.
- Provide turn down boots for inlet and outlet to interceptor.
- Offset below grade and route to ≈5000-gallon H20 rated interceptor below grade – location to be coordinated with site design.
- Outdoor, below grade grease waste piping shall be heat traced.

Storm

Storm water will be collected by roof drains and carried to building drains which exit the building and are connected to the storm water reclamation system. Emergency overflow storm water will be collected by a series of overflow drains and carried to exterior walls where they will daylight to grade. Piping systems for primary and emergency roof drains will be separate.

- Roof drain piping will be routed to the closest column to avoid horizontal piping above ceiling wherever possible.
- Overflow piping will be routed to the exterior walls and down to the first floor with individual discharge outlets approximately 24” above finished grade.
- Primary and secondary storm piping shall be sized to include vertical wall loads required by IPC 1106.4.
- Below grade storm piping shall consist of PVC DWV pattern.
- Above grade storm and overflow piping shall consist of no-hub cast iron and will be insulated.

Fire Suppression and Fire Alarm

BUILDING 15: EXISTING CATAWBA HOSPITAL

Built in 1953, this existing building is a large seven-story fully sprinklered building that is also equipped with an antiquated Siemens MXL Fire Alarm System. No major renovations are anticipated within this building, but minor renovations to incorporate a connector corridor from this building to a new 3 to 4-story business occupancy building would occur. Building 15 will be connected to the multi-story office building via a new pedestrian walkway connector constructed in accordance with the VCC Chapter 3104. The connector shall be built from non-combustible construction. The walls separating the connector from each building shall be capable of resisting the passage of smoke as required by VCC § 3104.5.2 and shall be fully sprinklered.

Fire Alarm System

There is another project to replace and upgrade the existing fire alarm systems in Building 15. Any existing fire alarm system deficiencies will be addressed as part of the fire alarm system

replacement project. Minor modifications to the existing fire alarm system will be required where the new pedestrian connector will attach to existing Building 15.

Fire Suppression System

The existing building is fully sprinklered (wet pipe sprinkler system with selective areas served by dry-pipe systems where the areas are not conditioned and subject to freezing). The existing building is also equipped with a Class 1 standpipe system as required by the VCC, with hose valves located in each stairwell and elevator lobby enclosure. Minor modifications to the existing fire suppression system will be required where the new pedestrian connector will attach to existing Building 15.

BUILDING 17: CATAWBA HOSPITAL TREATMENT MALL

Built in 1939, this existing building is a large two-story concrete and masonry building with a partial basement. The existing building is assumed to be a Type VA construction building due to the wood frame roof. The building is fully sprinklered and provided with a fire alarm detection and notification system. Record documents indicate that the building is considered a Group B occupancy. Building 17 will be connected to the new SUD Inpatient Hospital building via a new pedestrian walkway connector constructed in accordance with the VCC Chapter 3104. The connector shall be built from non-combustible construction. The walls separating the connector from each building shall be capable of resisting the passage of smoke as required by VCC § 3104.5.2 and shall be fully sprinklered.

Fire Alarm System

The manufacturer of the existing fire alarm system, (Siemens MXL) has phased out the MXL product line and support. There is another project to replace the existing Siemens fire alarm system. Minor modifications to the existing fire alarm system will be required where the new pedestrian connector will attach to existing Building 17.

Fire Suppression System

The existing building is fully sprinklered (wet pipe sprinkler system with selective areas served by dry-pipe systems where the areas are not conditioned and subject to freezing). Minor modifications to the existing fire suppression system will be required where the new pedestrian connector will attach to existing Building 17.

SUD INPATIENT HOSPITAL

The building will be Type IB construction as required for multiple story buildings classified as I-2. Under all three options, a new fire alarm notification and detection system shall be provided. Under all three options a new fire suppression water supply service and automatic sprinkler system shall be provided.

Fire Alarm System

A new fire alarm system shall be provided in accordance with VCC § 907.2.6. A manual fire alarm system and associated occupant notification system is required for a Group I-2 occupancy building. In addition, automatic smoke detection is required in corridors of Group I-2

occupancy buildings under Group I-2, Condition 1 and throughout in accordance with VCC § 407 for Condition 2.

Fire Suppression System

A new sprinkler system is required for all options as the building is considered a Group I-2 Occupancy under these options. A new sprinkler service and riser will be required. A standpipe system is not required. The fire suppression system shall be zoned to align with each smoke compartment.

SUD RESIDENTIAL HOUSING

This new two-story light gage steel and masonry building is intended to serve as an SUD Residential housing building for incoming residents as needed. The buildings will be 8,000 square feet per floor, and 16,000 square feet total for each building. The buildings will be defined as Group I-3 use. Type IIB construction as required for multiple story buildings classified as I-3.

Fire Alarm System: A new fire alarm system shall be provided as required by VCC § 408.10 in accordance with VCC § 907.2.6.3. Group I-3 buildings shall be equipped with a manual fire alarm system and automatic smoke detection system installed for alerting staff. Actuation of an automatic fire-extinguishing system, automatic sprinkler system, a manual fire alarm box or a fire detector shall initiate an approved fire alarm signal that automatically notifies staff.

Manual fire alarm boxes are not required to be located in accordance with VCC § 907.4.2 where fire alarm boxes are provided at staff attended locations having direct supervision over areas where manual fire alarm boxes have been omitted. In addition, manual fire alarm boxes are allowed to be locked in areas occupied by detainees, provided that staff members are present within the subject area and have keys readily available to operate the manual fire alarm boxes.

An automatic smoke detection system shall be installed throughout resident housing areas, including sleeping units and contiguous day rooms, group activity spaces and other common spaces normally open to residents. The smoke detection system is not required in sleeping units in use conditions 2 and 3 as described by VCC § 308. Smoke detectors are not required in sleeping units with four or fewer occupants in smoke compartments that are equipped throughout with an automatic sprinkler system installed in accordance with VCC § 903.3.1.1.

Fire Suppression System: An automatic sprinkler system is required for buildings with Group I-3 occupancies regardless of building height and area as required by VCC § 408.11. A new sprinkler service and riser will be required. A standpipe system is not required.

SUD OUTPATIENT BUILDING

This new steel framed building is intended to serve as an outpatient education and research building for the residents. The building would also house new administrative and support spaces. Options A and B will be similar in scope and size (3 story structure); however, Option C introduces an additional top floor of shell space for future expansion (4 story structure).

The building will be 70,000 square feet total with fourth-floor shell space. The building will be defined as Group B use. Type IIB construction as required for multiple story buildings classified as Group B.

Fire Alarm System

A manual fire alarm system and associated occupant notification system is required if the combined Group B occupant load of all floors is 500 or more, or the Group B occupant load is more than 100 persons above or below the lowest level of exist discharge, or if the fire area contains an ambulatory care facility. All occupants will be considered ambulatory and will not be rendered incapable of self-preservation. The occupant load factor, based upon the total facility square footage is less than 500 using an occupant load factor of 150 square foot per person IAW VCC table 1004.5. On a floor-by-floor basis, the calculated occupant load is 106 occupants per floor under the 3-story option and 100 occupants per floor under the 4-story option. Given the thresholds for all options being at or near the limit to require a new manual fire alarm system, a new fire alarm system will be required.

Fire Suppression System

For Options A and B, a new sprinkler system is not required. A new sprinkler system is required for Option C as the VCC requires sprinkler protection in new Business Occupancy Buildings greater than 3 stories in height. A new sprinkler service and riser will be required for Option C. In addition, for Option C, a Class 1 standpipe system is required as the building will be four or more stories above grade.

Design Criteria

Fire suppression and alarm systems design will conform with the design guidelines of all applicable codes and standards of the Authorities Having Jurisdiction (AHJ).

Codes, Design Guidelines and Material Standards

- 2021 Virginia Uniform Statewide Building Code (VUSBC)
- 2021 Virginia Construction Code (VCC)
- 2021 Virginia Statewide Fire Prevention Code (SFPC)
- 2021 Virginia Existing Building Code (VEBC)
- 2010 ADA Standards for Accessible Design
- NFPA 10 – Standard for Portable Fire Extinguishers (2018 edition)
- NFPA 13 – Standard for Installation of Sprinkler Systems (2019 edition)
- NFPA 14 – Standard for the Installation of Standpipe and Hose System (2019 edition)
- NFPA 70 – National Electrical Code (2020 edition)
- NFPA 72 – National Fire Alarm and Signaling Code (2019 edition)
- NFPA 80 – Standard for Fire Doors and Other Opening Protectives (2019 edition)
- NFPA 99 – Health Care Facilities Code (2021 edition)
- NFPA 101 – Life Safety Code (2021 edition)
- CPSM – Latest version of the CPSM to be used during design.

Fire Alarm System
The project will include renovations to existing fire alarm systems (Building 15 and 17) and installation of new fire alarm systems as described above.

Where new fire alarm systems are required, the buildings will be provided with new analog/addressable fire alarm systems in accordance with the occupancy requirements. Each of the alarm devices shall transmit a unique, addressable signal to the buildings' fire alarm control panels. The control panel will send the alarm signals to the Catawba fire department to initiate fire department emergency response via new digital alarm communication transmitters via paired telephone wiring and/or via fiber network.

The fire alarm systems will interface with and monitor the sprinkler systems, HVAC systems for unit shutdown and smoke damper control, door hold-open devices for door release, elevator systems for shunt tripping and recall functions, and other necessary supervision (e.g., life safety generators, emergency power monitoring, two-way radio fire fighter communications systems, etc.).

Occupant evacuation notification will be initiated by the fire alarm system and will be via strobes and speakers. Where occupants or patients remain overnight, smoke alarms are required in accordance with the VCC. Spacing and location of audible and visual notification will be compliant with ADA standards, NFPA 72, and state and local codes in each of the renovated spaces.

All new systems shall be compatible with the existing campus fire alarm system manufactured by Siemens.

Fire Suppression Systems
The project will include renovations to existing automatic sprinkler systems (Building 15 and 17) and installation of new fire suppression systems as described above.

Fire Protection will be provided by fire hydrant systems and automatic sprinkler systems where noted above as applicable for each building in the project scope. Fire pumps are not anticipated given the water supply capabilities and limited height of the buildings being protected.

Backflow prevention will be required on the fire water supply lines. This will be in an external fire connection vault or inside the building if space is available and the required access can be provided.

Wet pipe automatic sprinkler systems designed and installed in accordance with NFPA 13 will be provided to protect all areas of the buildings where applicable. In areas where the building is not conditioned to provide a minimum of 40 °F year-round, dry-pipe or pre-action systems will be required. All building areas that provide access to behavior health patients shall be designed to include anti-ligature components (e.g., institutional type sprinkler heads) and all system piping in these areas shall be concealed.

All new and modified systems will require hydraulic calculations to indicate the water supply can provide adequate flow and pressure in accordance with NFPA 13.

Standpipe systems, where required, shall be installed with fire hose valves located in the exit stairwells or remote sections of the buildings. The standpipe riser will be combined with the sprinkler system risers when both are provided in the same stairwells.

Where the seismic design category is C or greater, all sprinkler systems shall be seismically braced.

Concept Schedule

This study required the comparison of three options for the design and construction of the new SUD facility. While there are various project delivery methods, for the purpose of this study, the CM at Risk project delivery method was used to develop the concept schedules for each option. Simply, CM at Risk is a methodology where an owner contracts separately with a designer and procures the Construction Manager (CM) before Schematic Design is completed. The CM is on board early to provide constructability and cost information during design. Once the design is complete the CM is then responsible for constructing the facility.

The conceptual schedules incorporate the following principal activities:

- SUD Operator Procurement
- Designer Procurement
- Design
- Construction

These principal activities incorporate many sub-activities; for example, the Design activities include not just the actual design work by the designer, but also the standard regulatory reviews required by the Construction and Professional Services Manual. In addition, the strategy to break the project funding into parts noted in the executive summary would require working drawing and construction funding be secured prior to approval of preliminary design.

The schedules provide insight into the estimated time necessary to deliver each option for occupancy and use.

Option A - Mini-Continuum of Care Model				
Activities	**Duration (Months)**	**Start**	**End**	**Comments**
Predesign				
Pre-Planning - Feasibility	N/A	Apr-24	Jun-24	Pre-Planning not in Design Total / Current Feasibility Scope
Create Operator RFQ	2	Jul-24	Aug-24	
Operator RFP and Procurement	2	Sep-24	Oct-24	
Total Predesign	**4**			
Design				
Procure Designer	2	Nov-24	Dec-24	
Schematic Design	5	Jan-25	May-25	Assumes one Option into SD - Oct 2024 Start
Procure CM @ Risk	3	Mar-25	May-25	Overlaps SD Phase
Preliminary Design	6	Jun-25	Nov-25	
Working Drawings	9	Dec-26	Aug-26	
Total Design	**22**			All Design Phase Durations include DEB review and approval
Construction				
Construction	25	Sep-26	Oct-28	New construction Complete, does not include split packages
Mid - Point of Construction			Oct-27	Point of reference for Cost escalation
Total Construction	**25**			
Building Activation				
Furniture and Equipment	2	Sep-28	Oct-28	Move in all Furniture and Equipment to start after Punch List
SUD Program Activation "Go Live"	3	Nov-28	Jan-29	
Total Building Activation	**5**			
Project Completion	**56**		**Jan-29**	

Option B - Base Continuum of Care Model

Activities	Duration (Months)	Start	End	Comments
Predesign				
Pre-Planning - Feasibility	N/A	Apr-24	Jun-24	Pre Planning not in Design Total / Current Feasibility Scope
Create Operator RFQ	2	Jul-24	Aug-24	
Operator RFP and Procurement	2	Sep-24	Oct-24	
Total Predesign	**4**			
Design				
Procure Designer	2	Nov-24	Dec-24	
Schematic Design	5	Jan-25	May-25	Assumes one Option into SD - Oct 2024 Start
Procure CM @ Risk	3	Mar-25	May-25	Overlaps SD Phase
Preliminary Design	6	Jun-25	Nov-25	
Working Drawings	10	Dec-26	Sep-26	
Total Design	**23**			All Design Phase Durations include DEB review and approval
Construction				
Construction	26	Oct-26	Dec-28	New construction Complete, does not include split packages
Mid - Point of Construction			Nov-27	Point of reference for Cost escalation
Total Construction	**26**			
Building Activation				
Furniture and Equipment	2	Nov-28	Dec-28	Move in all Furniture and Equipment to start after Punch List
SUD Program Activation "Go Live"	3	Jan-29	Mar-29	
Total Building Activation	**5**			
Project Completion	**58**		**Mar-29**	

Option C - Enhanced Continuum of Care Model

Activities	Duration (Months)	Start	End	Comments
Predesign				
Pre-Planning - Feasibility	N/A	Apr-24	Jun-24	Pre Planning not in Design Total / Current Feasibility Scope
Create Operator RFQ	2	Jul-24	Aug-24	
Operator RFP and Procurement	2	Sep-24	Oct-24	
Total Predesign	**4**			
Design				
Procure Designer	2	Nov-24	Dec-24	
Schematic Design	5	Jan-25	May-25	Assumes one Option into SD - Oct 2024 Start
Procure CM @ Risk	3	Mar-25	May-25	Overlaps SD Phase
Preliminary Design	6	Jun-25	Nov-25	
Working Drawings	10	Dec-26	Sep-26	
Total Design	**23**			All Design Phase Durations include DEB review and approval
Construction				
Construction	28	Oct-26	Feb-29	New construction Complete, does not include split packages
Mid - Point of Construction			Dec-27	Point of reference for Cost escalation
Total Construction	**28**			
Building Activation				
Furniture and Equipment	2	Jan-29	Feb-29	Move in all Furniture and Equipment to start after Punch List
SUD Program Activation "Go Live"	3	Mar-29	May-29	
Total Building Activation	**5**			
Project Completion	**60**		**May-29**	

Concept Estimate

A cost estimate of the Substance Use Disorder Treatment Facility on the Catawba Campus was performed to determine the likely cost of the concept options. As detailed plans and specifications are not available, construction costs are estimated on a square foot basis, and on the details provided in the concept narratives provided in this feasibility report. Those costs are derived from databases, such as RS Means and internal cost databases of like projects. These costs are adjusted based upon the location of the project and reflect labor and material costs peculiar to the area. The soft costs reflect the other non-construction costs associated with developing the project but are often calculated as a percentage of the construction costs for a typical Commonwealth of Virgina State project at this stage. Below is the Project Cost Summary followed by the construction cost estimate.

SUD Treatment Facility Project Cost Summary			
Continuum of Care Model	Construction Cost	Soft Cost 25%	Project Cost
Option A Mini	128,158,580	32,039,645	**$ 160,198,225.00**
Option B Base	191,939,000	47,984,750	**$ 239,923,750.00**
Option C Enhanced	219,230,000	54,807,500	**$ 274,037,500.00**

Construction Cost Summary

Final Design Estimate 6/14/24	***BCC Building Cost Consultants, Inc.*** Substance Use Disorder Treatment Facility on The Catawba Campus Feasibility Study - Concept Design Roanoke, Virginia BCC Job No.: 24-05-0044	QTY. NO. UNITS	QTY. UNIT	MATERIAL & LABOR PER UNIT	MATERIAL & LABOR TOTAL
ITEM	**DESCRIPTION**				
FINAL SUMMARY SHEET		**Cost Per Square Foot**			
	Option A - Mini-Continuum of Care Model	226,400	S.F.	$566.07	$128,158,580.00
	Option B - Base Continuum of Care Model	358,200	S.F.	$535.84	$191,939,000.00
	Option C - Enhanced Continuum of Care Model	397,000	S.F.	$552.22	$219,230,000.00
NOTE:	The following mark-ups are included in the above costs:				
	General Conditions, Overhead, Profit, Insurance and Bond -	15%			
	Pre-Planning - Design Contingency -	*15%*			
	Escalation -	14.5%			

QUALIFICATIONS

1. Assumed construction to be during normal working hours.
2. No asbestos removal is included.
3. The construction costs shall be used for budgeting and planning purposes only and shall not be used as an actual bid as given by a contractor to build the project.
4. The construction totals are rounded to the nearest $10.00.

Option A - Mini-Continuum of Care Model					
Final Design Estimate	***BCC Building Cost Consultants, Inc.*** Substance Use Disorder Treatment Facility on The Catawaba Campus Feasibility Study - Concept Design Roanoke, Virginia BCC Job No.: 24-05-0043	QTY. NO. UNITS	QTY. UNIT	MATERIAL & LABOR PER UNIT	MATERIAL & LABOR TOTAL
6/14/24	**Description**				
	This model is considered the minimum effort necessary to effectively deal with the increasing SUD cases in the				
	A new 52,000 square foot three-story SUD outpatient facility would be built adjacent to Building 15 to provide				
	SUD Inpatient Hospital				
	64 Inpatient beds				
	16 - Detox inpatient beds (note more intense, more hospital like would include headwall similar to a MedSurg room, direct, nurse observation, etc.)				
	Total Hospital Beds: 80				
	Total S.F.: 112,000 (New Construction)	112,000	S.F.	$682.00	$76,384,000.00
	(includes shelf space on second floor of detox unit for future build out of 16 additional Detox beds.)				
	Shell: 22,490 S.F. (New Construction)	22,490	S.F.	$242.00	5,442,580.00
	Total SF. 134,490 S.F.				
	SUD Residential Housing				
	4 sleeping rooms per unit all doubles total 8 beds per unit. Total per floor 16 Beds, buildings will always be 2 stories with no egress stairs or elevators as they're tied into the hill at grade to save cost. Total beds per building 32 beds.				
	Total S.F. per Building: 20,800 - 1 building x 3 buildings 20,800 S.F. each =	62,400	S.F.	$385.00	24,024,000.00
	Total Buildings Option A - 3				
	Total SF : 62,400				
	SUD Outpatient building				
	Option A 52,000 S.F.	52,000	S.F.	$429.00	22,308,000.00
	CONSTRUCTION TOTAL =				**$128,158,580.00**
	COST PER SQUARE FOOT FOR	**226,400**	**S.F.**	**=**	**$566.07**

Option B - Base Continuum of Care Model					
Final Design Estimate	***BCC Building Cost Consultants, Inc.*** Substance Use Disorder Treatment Facility on The Catawaba Campus Feasibility Study - Concept Design Roanoke, Virginia BCC Job No.: 24-05-0043	QTY. NO.	QTY.	MATERIAL & LABOR PER UNIT	MATERIAL & LABOR TOTAL
6/14/24	**Description**	**UNITS**	**UNIT**		
	To accomplish this Option, 104 SUD Inpatient beds would be provided in a new building that will meet best				
	A new 52,000 square foot, three-story SUD outpatient facility would be built adjacent to Building 15 to provide				
	SUD Inpatient Hospital				
	104 Inpatient beds				
	32 - Detox inpatient beds (note more intense, more hospital like would include headwall similar to a MedSurg room, direct, nurse observation, etc.) - Shell space fit out from Option A, if phased construction.				
	Total Hospital Beds: 136				
	Total S.F.: 190,400 S.F. (New Construction)	190,400	S.F.	$682.00	$129,852,800.00
	(Includes shelf space on second floor of impatient units for future build out of 24 additional Inpatient beds.) - unit size is 2 - 12 bed units per floor with a shared core. (24 Bed unit)				
	Shell: 33,600 S.F.	33,600	S.F.	$242.00	8,131,200.00
	Total SF. 224,000				
	SUD Residential Housing				
	Total SF per Building: 20,800				
	Total Buildings Option A - 4				
	Total SF : 82,200 S.F.	82,200	S.F.	$385.00	31,647,000.00
	SUD Outpatient Building				
	Option B 52,000 ft.²	52,000	S.F.	$429.00	22,308,000.00
	CONSTRUCTION TOTAL =				**$191,939,000.00**
	COST PER SQUARE FOOT FOR	**358,200**	**S.F.**	**=**	**$535.84**

Option C - Enhanced Continuum of Care Model					
Final Design Estimate 6/14/24	***BCC Building Cost Consultants, Inc.*** Substance Use Disorder Treatment Facility on The Catawaba Campus Feasibility Study - Concept Design Roanoke, Virginia BCC Job No.: 24-05-0043 **Description**	**QTY. NO. UNITS**	**QTY. UNIT**	**MATERIAL & LABOR PER UNIT**	**MATERIAL & LABOR TOTAL**
	For this Option, 128 SUD Inpatient beds would be provided in a new building that will meet best practices and				
	A new 70,000 square foot four-story SUD outpatient facility would be built adjacent to Building 15 to provide				
	SUD Inpatient Hospital				
	128 Bed - Inpatient beds				
	32 - Detox inpatient bed- (Note more intense, more hospital like would include headwall similar to a MedSurg room, direct, nurse observation, etc.) - Shell space fit out from Option A, if phased construction.				
	(Includes building out shell space on second floor of inpatient units of 24 additional inpatient beds.) - unit size in this area is 2 12 beds per units per floor with a shared core.				
	Total Hospital Beds: 160				
	Total SF. 224,000	224,000	S.F.	$682.00	$152,768,000.00
	SUD - Residential housing				
	(Very similar to VCBR with a few more offices in group spaces. Never shell just future buildings)				
	Total SF per Building: 20,800				
	Total Buildings Option A - 5				
	Total SF : 104,000 S.F.	104,000	S.F.	$385.00	40,040,000.00
	SUD Outpatient building				
	70,000 S.F. (This option includes a shell for on the fourth floor of about 17,000 S.F.)	52,000	S.F.	$429.00	22,308,000.00
	70,000 S.F. (This option includes a shell for on the fourth floor of about 17,000 S.F.)	17,000	S.F.	$242.00	4,114,000.00
	CONSTRUCTION TOTAL =				**$219,230,000.00**
	COST PER SQUARE FOOT FOR	**397,000**	**S.F.**	**=**	**$552.22**