



Charlotte County Utilities

CHARLOTTE COUNTY UTILITIES DESIGN COMPLIANCE STANDARDS

DATED AUGUST 1, 2023

Which includes:

- 1. MINIMUM DRAWING AND SUBMITTAL REQUIREMENTS FOR POTABLE WATER, WASTEWATER, AND RECLAIMED WATER PROJECTS**
- 2. CADD STANDARDS**
- 3. STANDARD SPECIFICATIONS**
- 4. STANDARD DETAILS**
- 5. DESIGN MANUAL**

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I hereby certify that these Design Compliance Standards were prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Florida.

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INTRODUCTION

The standards set forth in this document (as amended from time to time) are intended to provide a basis for permitting, design and construction of potable water, sanitary sewer, and reclaimed water infrastructure within Charlotte County Utilities' (CCU) Service Area. This design manual is to supplement construction and material specifications as described in the approved CCU Standard Specifications and Design Drawings. Applicable Federal, State, and Local laws and regulations should be considered concurrently with this text. Any variation from these standards shall be approved, in writing, by Charlotte County Utilities (CCU) prior to construction. The requirements of this document shall be applicable in all cases where the facilities to be constructed shall be owned and maintained by CCU.

When standards or specifications are indicated herein by reference, the referenced portion shall apply to the most recent edition of the publication and shall have the same force and effect to the extent indicated by the references thereto, as if they were included herein in their entirety. All referenced material can be found on the Charlotte County Utilities and Charlotte County Community Development websites.

**CHARLOTTE COUNTY
UTILITIES DESIGN MANUAL**

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STANDARD DETAILS

DRAFT

CHARLOTTE COUNTY UTILITIES DESIGN MANUAL

DEFINITIONS & ABBREVIATIONS

1. ANALOGOUS WORDS AND TERMS

A. General

For the purpose of this manual, analogous words and terms shall be interpreted to have similar meanings when not inconsistent with the context.

- 1) Words used in the singular number include the plural; and, words used in the plural number include the singular.
- 2) Words used in the present tense include the future tense.

B. Common Analogous Words

- 1) The following words shall be interpreted to have similar meanings when not inconsistent with the context.
 - a) Constructed - Erected, Built, Installed, Rebuilt and Repaired.
 - b) Structure - Building.
- 2) Include” is a word of enlargement and not limitation.
- 3) The word “shall” is mandatory and the word “may” is permissive.

2. DEFINITIONS

Except where specific definitions are used within a specific section of this manual for the purpose of such sections, the following terms, phrases, words and their derivations shall have the meaning given herein when not inconsistent with the context:

A. GENERAL

ACCESSWAY: Land that is used or intended to be used for ingress or egress to abutting parcels of land and is not dedicated to the public.

APPLICANT: Any individual, firm, association, syndicate, co-partnership, corporation, trust or any other legal entity, or their duly authorized representative conducting activities under these regulations.

ARCHITECT: A professional architect duly registered and licensed by the State of Florida. BOARD: The Board of County Commissioners of Charlotte County.

BUILDING: Any structure built for the support, shelter or enclosure of persons, animals, chattels or property of any kind which has enclosing walls for fifty (50) percent of its perimeter. The term "building" shall be construed as if followed by the words "or part thereof".

COUNTY: Charlotte County, Florida.

CURRENT: As used herein, pertains to the regulations in effect at the time an application or plan is presented for acceptance or approval.

CUSTOMER: Any person, firm, corporation, or government entity, using or receiving water and/or wastewater service from Charlotte County Utilities potable water and/or wastewater system(s).

DEVELOPER: Any individual, firm, association, syndicate, co-partnership, corporation, trust, or any other legal entity commencing development.

DIRECTOR: Charlotte County Utilities' Department Director or his authorized representative.

DRIVEWAY: An accessway which provides vehicle access from a street to a single parcel of land containing two or fewer dwelling units in a single structure and from which vehicles may legally enter or leave the street in a forward or backward motion.

DWELLING UNIT: A room or rooms connected together, constituting a separate, independent housekeeping establishment for a family, for owner occupancy, or for rental or lease on a weekly, monthly or longer basis, and physically separated from any other rooms or dwelling units which may be in the same structure, and containing sleeping and sanitary facilities and one kitchen. The term "dwelling unit" shall not include rooms in hotels, motels or institutional facilities.

EASEMENT: A grant of a right to use land for specified purposes. It is non-

possessory interest in land granted for limited use purposes. Where the term “easement” is preceded by the term “street” or any other adjective, the preceding term describes the easement's purpose.

ENGINEER: A professional engineer duly registered and licensed by the State of Florida.

LANDSCAPE ARCHITECT: A professional landscape architect duly registered and licensed by the State of Florida.

LOT FRONT: The distance measured along a line between the points of intersection of the side lot lines with the street right-of-way or easement.

LOT LINE: A line which designates the boundary of a lot.

LOT LINE FRONT: The lot line which divides the lot from a street right-of-way or easement.

LOT LINE SIDE: Any lot line other than a front or rear lot line, dividing said lot from the neighboring lot.

Multi-Family Residential Parcel: Property that contains three (3) or more attached dwelling units, regardless of whether the units are under common or individual ownership.

OWNER: Any person having a legal or equitable interest in property.

PERMIT: Any official document or certificate required or issued by the agency authorizing performance of a specified activity.

PERSON: Any individual, partnership, association, corporation, trust, or other legal entity. PLUMBING OFFICIAL: A Charlotte County Division of Codes and Building Services Code Enforcement Official.

PUBLIC STREET: A street that has been dedicated to the public; and the public through use of the street; or the Board through express action at a public hearing, has accepted the offer of dedication. Note: Regardless of the Board's acceptance of the offer of public dedication, the Board may or may not have accepted the street for maintenance purposes.

ROADWAY: A general term denoting land, property or interest therein, usually in a strip, acquired for, or devoted to, transportation purposes including the travel way, shoulders and swales.

SERVICE AREA: The geographical region consisting of the lot(s) being served or being proposed to be served by a public facility, including but not limited to public water or sewage systems.

STREET: (1) An access way which affords the principal means of ingress or egress to two (2) or more parcels of land; or,

(2) A right-of-way or roadway which affords the principal means of ingress or egress to a parcel of land.

(3) Synonyms with the terms avenue, boulevard, drive, lane, place, road, way, or similar terms.

STREET RIGHT-OF-WAY: A general term denoting land, property or interest therein, usually in a strip, acquired for, or devoted to, transportation purposes which has been dedicated to the public.

STRUCTURE: That which is built or constructed. The term "structure" shall be construed as if followed by the words "or part thereof".

SURVEYOR: A professional land surveyor duly registered and licensed by the State of Florida.

TRAFFICWAY: A public right-of-way the primary, though not necessarily the sole, purpose or use of which is to facilitate through movement of vehicles in substantial volume, rather than the providing of direct access to abutting properties. A trafficway may represent a freeway, expressway, arterial or collector street.

B. WATER

AIR GAP (AG): A physical separation between the free-flowing discharge end of a potable water supply pipeline and an open or non-pressure receiving vessel. An approved Air Gap separation shall be a distance of at least two (2) times the diameter of the supply pipe measured vertically above the top rim of the vessel - with a minimum distance of 3 inches.

BACK PRESSURE: any elevation of pressure in the downstream piping system (by pump, elevation or piping, or steam and/or air pressure) above the supply pressure at the point of consideration which would cause, or tend to cause, a reversal of the normal

direction of flow through the backflow prevention assembly.

BACK SIPHONAGE: A form of backflow due to a reduction in system pressure which causes a negative or sub-atmospheric pressure to exist at a site in the water system.

BACKFLOW: The undesirable reversal of flow of water or mixtures of water and other liquids, gases or other substances into the distribution pipes of the potable supply of water from any source or sources.

BACKFLOW PREVENTION DEVICE: Any one of the following devices used as a means to prevent backflow as described in the Backflow Prevention Devices section found in the current Charlotte County Utilities Standard Specifications.

(1) DOUBLE DETECTOR CHECK VALVE (DDCV): A specifically designated assembly composed of a line size approved double check valve assembly with a specific bypass water meter and a meter sized approved double check valve assembly. The meter shall register accurately for only very low rates of flow and shall show a registration for all rates of flow. This assembly shall only be used on fire lines to protect against a non-health hazard (i.e., pollutant).

(2) DOUBLE CHECK VALVE (DCV): An assembly composed of two single, independently acting, check valves, including tightly closing shutoff valves located at each end of the assembly and suitable connections for testing the water tightness of each check valve. A check valve is a valve that is drip-tight in the normal direction of flow when the inlet pressure is one psi and the outlet pressure is zero. The check valve shall permit no leakage in a direction reverse to the normal flow. The closure element (e.g. clapper) shall be internally weighted or otherwise internally loaded to promote rapid and positive closure. A backflow prevention device consisting of two internally loaded check valves, either spring loaded or weighted, installed as a unit between two resilient-seated shut off valves with properly located resilient-seated test cocks. This assembly shall only be *used to protect against a non-health type hazard*.

(3) PRESSURE VACUUM BREAKER (PVB): An assembly consisting of an independently operating internally loaded check valve, an air inlet valve located

on the discharge side of the check valve, with resilient-seated test cocks and resilient-seated shut off valves at each end of the assembly designed to prevent back siphonage. PVBs may not be subjected to back pressure.

(4) REDUCED PRESSURE PRINCIPLE (RPZ): An assembly consisting of two independently acting check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and below the first check valve. These units are located between two resilient-seated shut off valves and are equipped with properly located resilient-seated test cocks. Assembly is to be used for *High Hazard Protection*.

CERTIFIED Backflow prevention Assembly TESTER: A person who can prove competency to the satisfaction of Charlotte County Utilities (proof may be required). The tester shall have attended and successfully completed an approved course for Backflow Prevention Assembly Testers, or other programs or training acceptable to Charlotte County Utilities. CROSS-CONNECTION: Any unprotected actual or potential connection or structural arrangement between a public or a consumer's potable water system and any other source or system through which it is possible to introduce into any part of the potable system and any used water, industrial fluid, gas, or substance other than the intended potable water with which the system is supplied. By-pass arrangements, jumper connections, removable sections, swivel or change-over assemblies and other temporary or permanent assemblies through which or because of which "backflow" can or may occur are considered to be cross connections.

CROSS CONNECTION CONTROL: Control of connection between a potable water system and a non-potable plumbing and/or water system by proper installation of approved backflow prevention assembly that will continuously protect the potable water system.

HAZARD: Risk to public health and/or adverse affect on the Public Water Supply, the DEGREE OF which is derived from an evaluation of a particular hazard and/or the adverse effect of that hazard upon the public water system. Hazards are divided into 2

Categories:

(1) HEALTH HAZARD: A cross connection or potential cross connection involving any substance that could, if introduced into the potable water supply, cause death, illness, spread disease or have probability of causing such effects. A contaminate.

(2) NON-HEALTH HAZARD: A cross connection or potential cross connection involving any substance that generally would not be a health hazard but would constitute a nuisance or be aesthetically objectionable, if introduced into the public water system. A pollutant.

PRIVATE WATER SYSTEM: A water system that is supplied by a well, spring or other similar source of water, used for human consumption by four (4) dwelling units or less and is regulated by Chapter 381 of the Florida Statutes and Chapter 10D-4 of the Florida Administrative Code as may be amended from time to time.

PUBLIC WATER SYSTEM: A water system that is not a private water system as herein defined, and includes those water systems regulated under Chapter 381 of the Florida Statutes and defined as "Public Water Systems" "Community Water Systems", and "Non-Community Water Systems" in Chapter 17-22 of the Florida Administrative Code; and defined as "Public Water Systems" not covered or included in the "Florida Safe Drinking Water Act" in Chapter 10D-4 of the Florida Administrative Code, as may be amended from time to time.

SERVICE CONNECTION: The terminal end of service from the public potable water system. That is, it is that point where the water purveyor loses jurisdiction and sanitary control over the water at its delivery to the consumer. Typically at the meter installation.

WATER, NONPOTABLE: Water which is not safe for human consumption, or which is of questionable potability.

WATER, POTABLE: Water from any source which has been checked by the health department, and approved for human consumption.

WATER PURVEYOR: The owner or operator of a public, potable water system. As used herein, the water purveyor shall be Charlotte County Utilities.

WATER SYSTEM: A system of pipes, pumps, water treatment plants, or water sources, and all other appurtenances or equipment needed to treat, transport and distribute water.

C. Wastewater

INDIVIDUAL SEWAGE DISPOSAL SYSTEM OR FACILITY: Those sewage systems which include a septic tank, a system of piping and a soil absorption bed or drain field and as further defined and regulated by Chapter 381 of the Florida Statutes and Chapter 10D-6 of the Florida Administrative Code as may be amended from time to time.

PUBLIC SEWAGE SYSTEM: A sewage system that contains a wastewater treatment plant, is not an individual sewage disposal system, and is not regulated by Chapter 10D-6 of the Florida Administrative Code.

SERVICE CONNECTION: The terminal end of service from the public wastewater system. For gravity service connections, this would be a clean-out at the public right-of-way line or a Charlotte County Utilities Easement line. For pressurized main connections (force mains), this would be a plug valve at the public right-of-way line or a Charlotte County Utilities Easement line.

SEWAGE SYSTEM: A system of pipes, pumps, tanks or wastewater treatment plants and all other appurtenances or equipment needed to treat, transport and disposal of sewage.

3. ABBREVIATIONS:

A. AGENCIES:

AASHTO: American Association of State Highway & Transportation Officials ANSI:

American National Standards Institute

ASSE: American Society of Sanitary Engineers

ASTM: American Society for Testing Materials

AWWA: American Water Works Association

DER: Department of Environmental Regulation

DOT:

FDOT: Florida Department of Transportation (State)

EPA: Environmental Protection Agency (Federal Government)

FCCC & HR: Foundation of Cross Connection Control and Hydraulic Research
(University of Southern California)

NCPI: National Clay Pipe Institute

NEC: National Electrical Code

NEMA: National Electrical Manufacturers Association

NFPA: National Fire Protection Association

OSHA: Occupational Safety & Health Administration

UL: Underwriters Laboratories

B. GENERAL

DIP: Ductile Iron Pipe

fps: feet per second

gpd: gallons per day

gpm: gallons per
minute

mgd: million gallons per day

psi: Pounds per Square Inch (gauge)

PVC: Polyvinyl Chloride

ROW: Right-of-Way

SECTION 1

GENERAL REQUIREMENTS

1.1 GENERAL

- A. Developer needs to apply and obtain any other Local, State, and Federal permits applicable to the project (county site plan, dewatering, FDEP, etc).
 - 1. All applicable permits to be submitted to CCU PRIOR to construction commencement.
 - 2. Applicable Charlotte County Preliminary and Final Site Plan Approval
 - a) Owner shall submit all required documentation per Charlotte County Code.
 - 3. Applicable FDEP Construction Permits
 - a) Owner shall submit all required documentation per the FDEP.
 - 4. Applicable FDOT Construction Permits
 - a) For any work within the FDOT ROW, the Owner shall submit all required documentation per the FDOT to the FDOT for a construction permit.
- B. Site plan requirements
 - 1. Refer to the CCU Minimum Drawing and Submittal Requirements for Potable Water, Wastewater, and Reclaimed Water Projects for all General Plan Requirements.
 - 2. Refer to the Standard Drawing Details for all applicable details to be included within plans.

1.2 APPLICATION – RESIDENTIAL AND COMMERCIAL

- A. Mandatory Pre-Application meeting
 - 1. Submit request for meeting at coordinator.engineering@charlottecountyfl.gov
 - 2. Complete the Pre-Application Checklist items to be prior to meeting.
 - 3. Meeting must be scheduled and occur at least 7 days prior to construction commencement.
 - 4. Meeting is required to be attended by the Applicant/Owner and Engineer of Record.
- B. Letters of availability

1. Complete Utility Availability Form request and submit at time of pre-application meeting
- C. Fire flow test requests
 1. Complete Water Flow Test Application found on CCU website
 2. Form should be submitted to CCU at time of pre-application meeting
- D. Design standards – Refer to the Standard Specifications for each applicable section
- E. Utility report including:
 1. Report to include sections for Potable Water, Sanitary Sewer (Force Main/Lift Station), and Reclaimed Water;
 2. Utility report must be electronically signed and sealed by the Engineer Of Record (“EOR”);
 3. Engineering report shall detail the proposed utility design;
 4. All engineering design assumptions must be clearly identified;
 5. All supporting engineered design calculations
 6. All model results with diagrams
- F. Application submission
 1. Submission to be electronic through Accela
 2. Mid-review meetings are encouraged by CCU to help clarify design and streamline reviews.
 3. Approval with conditions
 - (1) Approvals may be given with conditions and all conditions must be satisfied prior to first water meter being installed.
 4. Submittal fees
 - a) Application fee will be \$1,000
 - b) Resubmittal fee for 3rd review and after = \$500 per submittal
 - c) Inspection Fee will be 6% of the Engineers Opinion of Probable cost of utility infrastructure, minimum of \$1,000.
 - (1) Inspection Fees are to be paid at time of Utility Agreement execution.

G. Staff review timelines (Business days)

1. Intake – 48 hours
2. Initial Review – 30 days
3. Resubmittal Review – 30 days
4. Permit issuance allowance – 7 days

1.3 POST-PERMIT APPROVAL

A. DEP Coordination and CCU signatures

1. Refer to CCU website for information necessary to include to submit for signatures of FDEP General Use Permit applications.
 - a) Submit to engineering department at coordinator.engineering@charlottecountyfl.gov
 - b) Email requesting additional information or signed application to be returned within five (5) business days

B. Pre-construction meeting

1. Mandatory meeting for contractor, owner, and engineer to be present
2. Request for meeting submitted through Accela
3. Meeting to be held at least 48 hours prior to construction commencement
4. Completed Pre-Construction Meeting Checklist with applicable documents to be submitted prior to meeting.

C. Shop drawing submittals

1. Shop drawings to be submitted one week prior to the pre-construction meeting
2. Submittal package to include:
 - a) Sanitary Sewer Manholes
 - b) Lift Station
 - (1) Pumps
 - (2) Wetwell
 - (3) Electrical Components
 - (4) Control Panel
 - (5) Telemetry Logics

1.4 DURING CONSTRUCTION

- A. Contractor is responsible for maintaining all site BMPs per Standard Specifications and State/Local requirements
- B. CCU inspector to be present onsite for periodic observation and inspections listed below:
 - 1. Pressure tests
 - a) Potable Water Mains
 - b) Force Mains
 - c) Reclaimed Water Mains
 - d) Gravity Sewer Low Pressure Test
 - 2. Sewer Main TV Inspection (at Inspectors discretion)
 - 3. Hot taps/main tie-in
 - 4. Flushing
 - 5. Hydrant assembly inspection
 - 6. Lift station startup
 - 7. Utility Walkthrough
- C. Inspections to be requested with 48-hr notice and are based on inspectors availability
- D. Inspections are to be scheduled through Accela for each project

1.5 POST CONSTRUCTION

- A. Record Drawings – Refer to CCU Minimum Drawing and Submittal Requirements for Potable Water, Wastewater, and Reclaimed Water Projects
- B. FDEP Certifications – Items to be submitted with checklist:
 - 1. Record Drawings
 - 2. Pressure test reports
 - 3. Passing Bac-t test results
 - 4. Sewer TV tapes
 - 5. Lift Station start-up
- C. Easements – Requirements of utility easements outside of the Right-of-Way

1. Easement to be 10' wide if adjacent to the existing ROW
 2. Easement to be 20' wide for single pressure main outside of ROW and for gravity sewer main up to 10' deep
 3. Easement to be 25' wide for a single gravity sewer main 12' deep or greater.
 4. Easement to be 25' wide for two pressure pipes included
 5. For easements containing a gravity sewer main and one pressure pipe – Add the gravity sewer requirement, based on depth, and Add 10'
 6. The maximum easement width required is 30' wide, unless otherwise approved by CCU
 7. Please refer to the CCU Utility forms for easement dedication language.
- D. Ownership transfer
- a) Utility Forms - <https://www.charlottecountyfl.gov/departments/utilities/about-utilities/forms.stml> Bill of Sale
 - b) Lien Releases
 - c) Easements
2. All applicable items to be submitted along with *Transfer ChecklistW*
- E. GIS – Reference Exhibit “x” for GIS standard naming convention
- F. Water meter requests
1. All necessary FDEP and CCU approvals and certifications are needed prior to submitting for first water meter
 2. Water meters are to be requested and paid for through Accela
- G. Warranty – Contractor to warranty all work for 1 year from the date of acceptance by Charlotte County Utilities.

1.6 MISCELLANEOUS

- A. Hydrant Meters may be requested from CCU for temporary construction water onsite

1. CCU has limited number of hydrant meters. If all are in use, developer can propose to purchase additional hydrant meter, meeting CCU specifications, for CCU to retain upon completion of project.
- B. Design Waiver
1. Variance request shall be submitted to CCU through email - coordinator.engineering@charlottecountyfl.gov
 2. Variances shall be reviewed within 1 week of submission
 3. Fee for variance request will be \$250 and shall be paid at time of variance request submission.
- C. Field Change
1. Field changes that are immaterial to overall project cost and design intent must be approved by CCU prior to installation.
 2. All changes or revisions to installation that deviate from approved site plans shall be noted and clouded on Record Drawings submitted to CCU.
- D. Contractors are responsible to call 811 prior to excavation or work commencement
- E. Utility damages during construction
1. Costs for any damages caused by contractor, or anyone under their responsible charge, to County facilities during construction will be held responsible.
 2. County will make any and all necessary repairs and invoice of costs to be reimbursed will be supplied to contractor.
 3. Contractor shall reimburse county for said costs within 30 days of receipt of invoice, or all future inspections will be held until time of payment.
- F. Restoration or repair of other property damages due to construction or material storage will be the contractors responsibility to complete before final certification is provided from CCU.
- G. CAD Standards
1. Please reference CCU website for all current CAD standards and layer templates to be used throughout the design plans.

SECTION 2

POTABLE WATER SYSTEMS

2.1 GENERAL

This section sets forth the general requirements for design, of water distribution systems for potable service and fire protection.

2.2 SYSTEM DESIGN

Potable water and fire protection shall be independent systems designed by a Florida Registered Professional Engineer (Engineer of Record) and constructed in accordance with the design and installation requirements as specified by Charlotte County Utilities (CCU), the Florida Department of Environmental Protection (FDEP), the Florida Department of Transportation (FDOT) and any other relevant state and local regulatory agencies as well as with the requirements established by the Charlotte County Land Development Code (LDC) as amended from time to time.

A. Flow Demands

1. CCU does not guarantee flow, fire flows, or pressure.
2. Flow demands for design shall be calculated on the basis of full development as known or projected. The average daily flow for domestic use shall be calculated at the minimum rate as follows:

B. Table 6-4: Schedule of daily rated gallonage for various occupancies based upon Charlotte County Code, Sect. 3-8-46	
The following usages shall be deemed to be applicable for the purpose of calculating connection fees for all new connections to the system. Commercial, Institutional, and other units not identified herein shall conform to the department of health and rehabilitative services section 64E-6.008.	
Types of Buildings	Usage
Apartments	157.5 gpd
Arcades (no food services) *other facilities/services calculated according to appropriate occupancies	3 gpd/seat
Restaurants, Bars, Cocktail Lounges, Fast Food	20 gpd/seat
Bars, Cocktail Lounges or Pubs not serving or preparing food	12 gpd/seat
Beauty Salons/Barber Shops <8 hours/day	50 gpd per chair

Beauty Salons/Barber Shops > or equal to 8 hours/day	74 gpd per chair
Boarding Schools (Students and Staff)	75 gpcd
Bowling Alleys (Toilet Wastes only, per lane)	50 gpd + 20 gpd per bar and restaurant seat
Construction, Manufacturing, or Industrial Equipment operations *other occupancies may apply, subject to reclaimed water applicability	Based on equipment supplier or Engineers design analysis data
Country Clubs (Per member)	5 gpd + 30 gpd per bar and restaurant seat
Day Schools (Students and Staff)	6 gpcd + 4gpcd if shower + 4 gpcd if cafeteria
Factories (With showers)	30 gpcd
Factories (Without Showers)	10 gpd/100 Sq. Ft.
Gas Stations without food outlets, per restroom	225 gpd
Car Wash	Based on equipment supplier data
Hospitals (in-patient services only, with or without laundry) *out-patient labs, medical Center operations and other facilities calculated according to appropriate occupancies	200 gpd/bed
Hotels and Motels	125 gpd/room or unit + 20 gpd per restaurant and bar seat
Laundromats	225 gpd/washer
Mobile Home Park	225 gpd/trailer
Movie Theaters, Auditoriums, Churches (Per Seat)	3 gpd
Churches	3 gpd per seat or per capita if no seat
Nursing Homes	100 gpd/bed
Office Buildings (excludes Medical Offices, Dental Offices, refer to FAC 64E-6-008 for the occupancies)	10 gpd/100 Sq. Ft.
Public Institutions (other than those listed herein)	75 gpcd
Single-Family Residence with (1) 5/8" x 3/4" meter *assumes a 3-bedroom residence. For residences with more than 3 bedrooms or that require larger meter refer to FAC 64E-6.008	225 gpd
Townhouse Residences	225 gpd
Stadiums, Frontons, Ballparks, Etc. (Per Seat)	3 gpd
Stores/Retail operations (Without Kitchen Wastes) *other occupancies may apply	5 gpd/100SQ.Ft.

Speculative Buildings	30 gpd + 10 gpd/100 Sq.Ft.
Warehouse (each unit) *other occupancies may apply. See FAC 64E-6.008 for self-storage units	30 gpd + 10 gpd/1000 Sq.Ft.

Gpd= gallon per day; gpcd= gallon per capita per day

- a) If use is not specified within table above, base flow is assumed to be 1,500 gpd/AC.
 - b) Refer to the most current rate resolution on CCU website for meter sizing fees.
3. A minimum peak hour factor shall be 2.5 times the average daily value.
 4. The Max Day peaking factor shall be 1.5 times the average daily value.
 5. An Equivalent Residential Connection (ERC) is equivalent to 225 gpd.
 6. Water Flow Test Requirements
 - a) A request to perform the test should be submitted at time of the pre-application meeting or to coordinator.engineering@charlottecountyfl.gov. A two-week time frame should be taken into consideration once the initial request is submitted.
 - b) Each test performed has a fee of \$150 per test.
 - c) The contractor or a 3rd party is required to perform the flow test with a CCU Inspector observing and certifying the test.
 - d) The contractor is to provide certification of calibration of their flow meter.
 - e) The contractor is to send a copy of the report to CCU.
- B. System Size Computation**
1. All design data and computer printouts shall be signed and sealed by a Professional Engineer and submitted showing the overall systems operations and any adverse impacts to the existing facilities for review and approval by CCU.
 2. The minimum design for water distribution systems shall provide for the greater of the two scenarios below:
 - a) Peak Hour Flow (PHF)
 - b) Max Day Flow (MDF) + Required Fire Flow
 - (1) Required fire flow shall be per the parameters set forth in NFPA 1 Section 18.4 – Fire Flow Requirements for Buildings

3. The allowable minimum service pressure under such design conditions shall be 20 psi.
4. Design computations shall be completed by a water modeling software and produce an engineer's report with the following information included:
 - a) Project Overview, including overall map.
 - b) Water Demand Calculations.
 - c) Build Out scenarios including fire flows.
 - d) Proposed Phasing scenarios.
 - e) Max Day plus Fire Flow results.
 - f) Peak Hour Flow results.
 - g) Junction Tables (Peak Hour and Max Day plus Fire Flow).
 - h) Pipe Tables (Peak Hour and Max Day plus Fire Flow).
 - i) Connection point: pressure and flow.

(1) If the project is phased a master model needs to be submitted for full buildout of the project and be able to reference future phases.

5. Master model/CAD to be submitted upon first site plan approval for the project
6. Results from hydraulic water modeling shall be provided on every project for CCU review and approval. CAD files to be submitted with application for each project.
7. Overall PUD process with include master water plans to be reviewed with community development at time of pre-application meeting.

B. Minimum Water Main Size

1. Single family and duplex dwelling unit developments shall be no less than 6-inches in diameter and maintain hydraulic minimums for fire flow.
2. Multifamily developments with three to six dwelling units per building and not exceeding more than two stories in height shall be no less than 6-inches in diameter.
3. Multifamily developments composed of buildings with more than six dwelling units per building and exceeding two stories in height shall be no less than 8-inches in diameter.
4. All commercial developments shall be no less than 8-inches in diameter.
5. All industrial developments and all hazardous storage areas shall be no less than 8-inches in diameter.

6. Allowable sizes of pipe: 6-inch, 8-inch, 12-inch, 16-inch, 20-inch, 24-inch, 30-inch, and 36-inch. No other sizes shall be allowed without prior written approval from the County.
7. Velocity must be a minimum 2 feet per second and a maximum 8 feet per second, unless otherwise approved by CCU.
8. Head loss shall not exceed 10 feet/1,000 feet.
9. Pipe losses shall be modeled using the Hazen Williams equation with a pipe roughness factor "C" of 120, to account for pipe friction and other minor losses throughout system.
10. Losses through master meters, 4-inches or larger, or other major losses shall be accounted for in the design.

C. Water Main Installation, Location and Depth

1. All piping shall be installed in accordance with the CCU Standard Specifications, pipe manufacturer's recommendations, and Standard Detail Drawings.
2. Where pipe deflections are necessary, they are not to exceed 50 percent of the maximum deflection limits recommended by the manufacturer and in accordance with CCU Standard Specifications.
3. Water main extensions are to conform to the existing water main design layout.
 - a) Water mains are to be installed on the same side of the road as the existing main unless otherwise approved by CCU.
4. The standard minimum cover for water mains shall be in accordance with CCU Standard Specifications.
 - a) Water main is intended to be installed at consistent cover. Deviation of conflict are subject to approval for CCU,
 - b) 36-inches from the top of pipe to finished grade for 6-inch through 12-inch pipes,
 - c) Minimum 54-inch depth from the top of pipe to finished grade for pipe sizes greater than 16-inches (Final depth subject to valve requirements).
 - d) Additional cover for avoidance of conflicts is subject to CCU approval.
5. Water mains shall be looped within project unless prior written approval obtained by CCU.
 - a) Where looping is not feasible, the dead end main shall be terminated with an

approved fire hydrant assembly.

6. No more than 50 units to be serviced from a single point of connection to the CCU distribution system.
 7. Directional Drilling, other than under waterways, shall be installed at depths of 4 to 8 feet. In a manner to minimize air pockets, depths greater than 8 feet will not be accepted. Any exceptions must be approved by CCU. For additional information, please see CCU Standard Specifications .
 8. Vertical and horizontal deflections shall be accomplished with the least amount of bend possible. Pipe deflection is preferred over 11.25-degree bends. 11.25-degree bends is preferred over 22.5-degree bends. 22.5-degree bends is preferred over 45-degree bends. Provide table showing amount of deflection per distance accomplished by each.
 9. ARVs are required at highpoints in the system or as required by CCU during review.
- D. Horizontal and Vertical Separation for Mains
1. All main separations, both horizontal and vertical, shall be per FDEP Rule 62-555.314, F.A.C.
 2. A minimum of ten (10) feet horizontal separation is also required between other public and/or private utilities, structure(s), building(s), wall(s), fountain(s), fence(s) and CCU infrastructure unless specifically approved by CCU.
 3. Drainage inlets shall be located no closer than (5) feet from proposed or existing water mains.
 4. All new light pole foundations shall be a minimum of five (5) feet from any existing or proposed CCU owned and maintained pipeline or facility unless approved by CCU.
 5. The root ball of palm trees shall be a minimum of five (5) feet and the root ball of shade trees shall be a minimum of ten (10) feet from any existing or proposed CCU owned and maintained pipe or facility.
 6. TV cable, telephone, gas, electric power, and irrigation lines may cross under CCU facilities with a minimum of eighteen (18) inches of vertical clearance.
- F. Water Meter Box
1. All water meter boxes to be furnished and installed by CCU Standard Specifications and

Standard Drawing Details.

2. Potable Water Master Meters –

a) For meter selection and details can be found in CCU Standard Specifications and Standard Drawing Details.

b) For Single Family developments, no master meters are allowed.

(1) Single Family or Two-Family Attached product may utilize meter banks.

(2) For Commercial applications, one master meter is required for each building.

G. Connection to Existing System

1. The cost of all work associated with making connections to the existing system shall be paid for by the Contractor.

2. All connections to existing mains shall be made as authorized by CCU.

3. A representative of CCU must be present at all tie-ins and wet taps.

a) Forty-eight hours advance notification is required.

4. Valves separating the mains being installed from existing mains shall be operated by or under the direction of CCU.

5. In the event any existing customers will be without water while a connection is being made; the Contractor shall notify them 72 hours in advance of when the water will be turned off and when he estimates service will be resumed.

a) These connections shall be made at night unless an alternate tie-in time is approved by CCU.

b) No customer shall be without water service for more than 4 hours unless specifically approved by CCU.

H. Tapping Sleeves

1. Tapping sleeves used to make "wet" taps into existing mains shall follow CCU Standard Specifications.

2. They shall be constructed with materials on the CCU Approved Products List.

3. No size on size allowed. If similar size mains are proposed to be connected, a cut in tee will be necessary.

a) When other types of pipelines are encountered, the proposed tap shall be at least 2

inches in diameter smaller than the diameter of the existing pipeline unless otherwise approved by CCU.

I. Gate Valves

1. Gate Valves shall be furnished and installed per CCU Standard Specifications and the Approved Products List.
2. No side actuated valves are allowed.
3. Gate valves shall be provided at all locations necessary to provide an operable, easily maintained, and repaired water distribution system including but not limited to:
 - a) Pipe terminations,
 - b) All intersecting water mains,
 - (1) The number of valves at connection points shall be one less than the number of legs.
 - (2) Valves shall be placed at extension of right of way lines.
 - c) Fire hydrants,
 - d) On both sides of all subaqueous crossings.
4. The maximum length of water main between valves which can be used for shutting down the line for repair work shall not exceed:
 - a) 25 units at a time for single family
 - b) 50 units or 600 feet whichever is greater of the two
 - (1) Types of multi-family include but are not limited to townhomes, twin villas, apartments, 6-plex, 12-plex etc.
 - (2) Additional valve spacing to be reviewed and approved by CCU.
5. Valves may only be operated by CCU staff or someone under the direct supervision of CCU staff.

J. Gate Valve Boxes

1. Valve Boxes shall be furnished and installed by the developer and in accordance with CCU Standard Specifications and the Approved Products List.

K. Fire Hydrants

1. Fire Hydrants shall be furnished and installed per CCU Standard Specifications and the

Approved Products List.

2. No private hydrants are allowed.
 - a) Up to the final hydrant and fire meter the line is to be under CCU ownership and within applicable easement.
 - b) The Fire Hydrant is to be located within the easement with sufficient access to the hydrant for use and proper maintenance.
 - c) A 7.5-foot clear zone in the front and the two sides with a 5-foot clear zone in the back of the hydrant is required.
 - d) Fire hydrants shall be installed on the 'parcel' side of the water main unless otherwise approved by CCU.
 - e) Maintain 2 feet of horizontal separation between the operating nut of the pumper nozzle and the edge of all sidewalks, unless otherwise approved in writing by CCU.
 - f) Hydrant barrels shall be painted AWWA Safety Yellow.
3. Hydrant Bonnets shall be painted per CCU Standard Specifications. Fire hydrants shall be spaced at no more than 800-feet for mobile home parks, mobile home subdivisions, recreational vehicle parks, and single-family residences as described in CCU Standard Specifications. Any deviation from this specification shall be at the discretion of the Utility Director and Charlotte County Fire Marshal.
4. Fire hydrants shall be spaced no more than 600-feet for industrial, commercial, apartment areas, other high-value areas, heavy manufacturing, and heavy industrial areas as described in CCU Standard Specifications.
5. Hydrants shall be placed on property lines or right of way extension lines.
6. For water quality purposes, fire hydrants shall be installed at the terminal end of all dead-end water mains.

N. Joint Restraining

1. Pipe restraints shall be in accordance with CCU Standard Specifications and Standard Drawing Details.

O. Electrolysis Prevention

1. All systems shall be designed to best avoid electrolytic action through the contact of

dissimilar metals.

2. Preventative action, if required by CCU, may consist of installing insulating or dielectric couplings between the two materials.

2.3 MATERIALS

1. Please see CCU Standard Specifications and approved Products List for acceptable materials.
2. HDPE is only to be used in trenchless installation applications or otherwise approved by CCU.
3. Fusible PVC pipe is not allowed in Charlotte County Utility service area.

2.4 CASING INSTALLATION

The provisions of this section shall represent the minimum standards and referenced sections for the design and installation of casing pipe for water mains as well as conditions requiring casing.

A. General

1. Casings shall be installed in accordance with permit conditions of the authority having jurisdiction.

B. Conditions Requiring Casing

1. When new roadways, turn lanes, acceleration lanes, deceleration lanes, or driveways are proposed; PVC or steel casing pipe with bell restraints and casing spacers shall be installed on any existing PVC main. CCU requires replacement of all old mains for existing mains.
2. New carrier pipe conditions which will require a casing are as follows:

Location	Carrier Pipe and Casing Material	
	PVC DR 18	DIP C 250
All Rights-of-Way, not under traveled way	none	none
Local Roadways and Collectors no more than 2 lanes		
Under Primary Travel Lane ¹	steel casing ³	steel casing ³
Under Secondary Travel Lane ²	steel casing ³	steel casing ³
Collector more than 2 lanes or Arterial Roadway		
Under Primary Travel Lane ¹	steel casing ³	steel casing ³
Under Secondary Travel Lane ²	steel casing ³	steel casing ³

Controlled Access, Expressway, and Freeway		
Under Primary Travel Lane ¹	steel casing ³	steel casing ³
Under Secondary Travel Lane ²	steel casing ³	steel casing ³
Railroads	steel casing ³	steel casing ³
Driveway or Access Drive		
For Institutional Sites (schools, hospitals, etc.)	steel casing ³	steel casing ³
For all others	none	none

Notes:

1. Includes condition where the carrier pipe crosses under both Primary and Secondary Travel Lanes together.
2. Condition where the carrier pipe is only under a Secondary Travel Lane.
3. Steel casing shall conform to the requirements of the Steel Casing Section of this Chapter.

3. In addition to the above, CCU reserves the right to require casings for new mains if conditions warrant and/or if deemed necessary.

C. Casing Pipe Installation

1. Please see CCU Standard Specifications and Approved Products List for installation specifics.

D. Casing Pipe Material

1. Please see the CCU Approved Products List for additional information on pipe material.

2.5 TESTING AND DISINFECTION

- A. Please Reference CCU Standard Specifications.

SECTION 3

SANITARY SEWER SYSTEMS

3.1 GENERAL

This section sets forth the general requirements for design and installation of sanitary sewer gravity collection system components including gravity mains, gravity manholes, sewage force mains, pump stations, low pressure sewers, and vacuum sewers.

3.2 SYSTEM DESIGN

Gravity collection systems shall be designed by a Florida Registered Professional Engineer (Engineer of Record) and constructed in accordance with the design and installation requirements as specified by Charlotte County Utilities (CCU), the Florida Department of Environmental Protection (FDEP), the Florida Department of Transportation (FDOT) and any other relevant state and local regulatory agencies as well as with the requirements established by the Charlotte County Land Development Code (LDC) latest edition.

A. Flow Demands

1. Flow demands for design shall be calculated on the basis of full development as known or projected.
 - a) For phased developments, the design shall be based on total build out conditions for the development, or the anticipated service area of the proposed pump station.
2. The average daily flow for domestic use shall be calculated at the minimum rate as follows:

B. Table 6-4: Schedule of daily rated gallonage for various occupancies based upon Charlotte County Code, Sect. 3-8-46	
The following usages shall be deemed to be applicable for the purpose of calculating connection fees for all new connections to the system. Commercial, Institutional, and other units not identified herein shall conform to the department of health and rehabilitative services section 64E-6.008.	
Types of Buildings	Usage
Apartments	157.5 gpd
Arcades (no food services) *other facilities/services calculated according to appropriate occupancies	3 gpd/seat
Restaurants, Bars, Cocktail Lounges, Fast Food	20 gpd/seat
Bars, Cocktail Lounges or Pubs not serving or preparing food	12 gpd/seat
Beauty Salons/Barber Shops <8 hours/day	50 gpd per chair
Beauty Salons/Barber Shops > or equal to 8 hours/day	74 gpd per chair
Boarding Schools (Students and Staff)	75 gpcd
Bowling Alleys (Toilet Wastes only, per lane)	50 gpd + 20 gpd per bar and restaurant seat
Construction, Manufacturing, or Industrial Equipment operations *other occupancies may apply, subject to reclaimed water applicability	Based on equipment supplier or Engineers design analysis data
Country Clubs (Per member)	5 gpd + 30 gpd per bar and restaurant seat
Day Schools (Students and Staff)	6 gpcd + 4gpcd if shower + 4 gpcd if cafeteria
Factories (With showers)	30 gpcd
Factories (Without Showers)	10 gpd/100 Sq. Ft.
Gas Stations without food outlets, per restroom	225 gpd
Car Wash	Based on equipment supplier data
Hospitals (in-patient services only, with or without laundry) *out-patient labs, medical Center operations and other facilities calculated according to appropriate occupancies	200 gpd/bed
Hotels and Motels	125 gpd/room or unit + 20 gpd per restaurant and bar seat
Laundromats	225 gpd/washer
Mobile Home Park	225 gpd/trailer
Movie Theaters, Auditoriums, Churches (Per Seat)	3 gpd

Types of Buildings	Usage
Churches	3 gpd per seat or per capita if no seat
Nursing Homes	100 gpd/bed
Office Buildings (excludes Medical Offices, Dental Offices, refer to FAC 64E-6-008 for the occupancies)	10 gpd/100 Sq. Ft.
Public Institutions (other than those listed herein)	75 gpcd
Single-Family Residence with (1) 5/8" x 3/4" meter *assumes a 3-bedroom residence. For residences with more than 3 bedrooms or that require larger meter refer to FAC 64E-6.008	190 gpd
Townhouse Residences	225 gpd
Stadiums, Frontons, Ballparks, Etc. (Per Seat)	3 gpd
Stores/Retail operations (Without Kitchen Wastes) *other occupancies may apply	5 gpd/100SQ.Ft.
Speculative Buildings	30 gpd + 10 gpd/100 Sq.Ft.
Warehouse (each unit) *other occupancies may apply. See FAC 64E-6.008 for self-storage units	30 gpd + 10 gpd/1000 Sq.Ft.

a) If use is not specified within table above, base flow is assumed to be 1,500 gpd/AC.

gpd= gallon per day

gpcd= gallon per capita per day

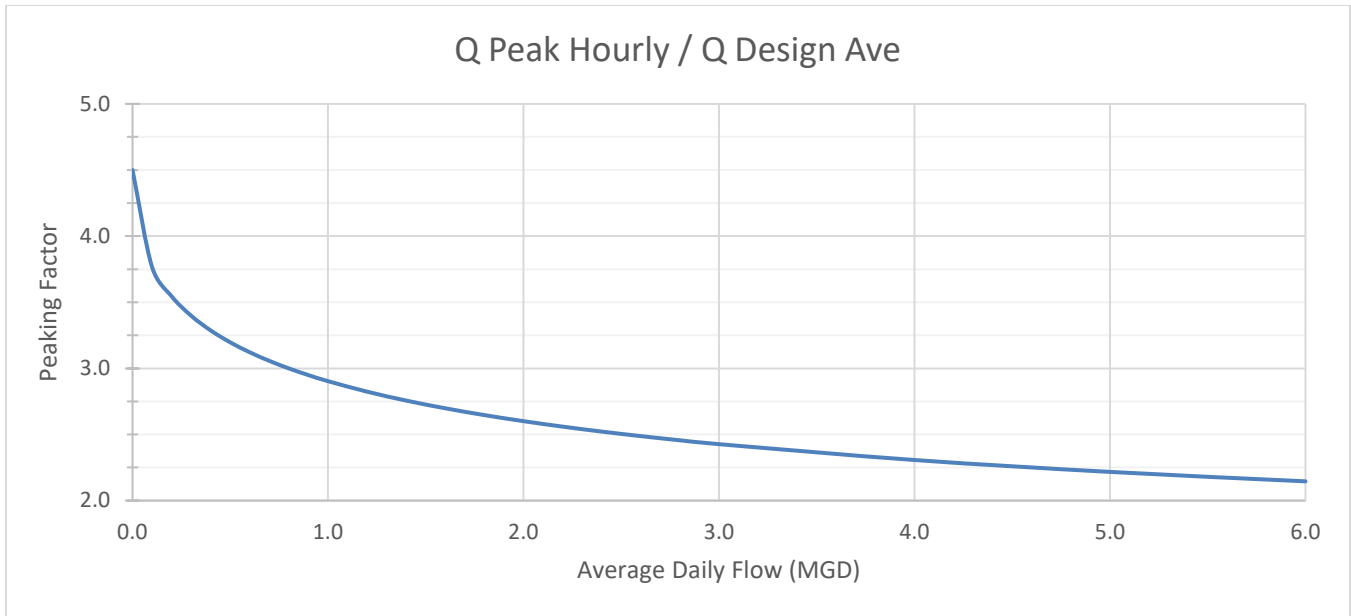
gpd/AC= gallon per day per Acre

b) Refer to the most current rate resolution on CCU website for meter sizing fees.

3. Gravity collection systems shall be sized to provide ample capacity for the required peak flow rates. The maximum required capacity shall be the product of the cumulative average daily flow for the total service area and the peak factor as calculated below:

$$\text{Peak factor for wastewater} = \frac{18 + \left(\frac{\text{Population}}{1000}\right)^{\frac{1}{2}}}{4 + \left(\frac{\text{Population}}{1000}\right)^{\frac{1}{2}}}$$

4. Minimum Peak Factor per flow graph below.



5. The minimum allowable peaking factor for an average daily flow above 6 mgd is 2.0.
6. An Equivalent Residential Unit (ERU) is equivalent to 190 gpd.

B. Horizontal and Vertical Separation for Mains

- a. All main separations, both horizontal and vertical, shall be per FDEP Rule 62-555.314, F.A.C.

3.3 GRAVITY MAIN DESIGN

This sub-section sets forth the general requirements for design and installation of sanitary sewer gravity mains, sewer manholes and service laterals.

A. Gravity Main Size Computation

1. Gravity sewer pipes shall be sized to provide ample capacity for the required peak flow rates.
2. Gravity sewer mains flow depth in pipe shall not exceed half the pipe diameter
3. The minimum allowable size for any gravity sewer pipes, other than service connections, shall be 8-inches in diameter.
4. All gravity sewers pipes shall be designed at slopes providing minimum velocities of not less than 2 feet per second (fps) when flowing full, based on Manning's formula and an "n" value of 0.011.

a) The following minimum slopes shall be used as a design guideline:

<u>Nominal Sewer Size</u>	<u>Minimum Slope</u>	<u>Max Slope</u>
8 inch	0.40%	10.0%
10 inch	0.28%	6.23%
12 inch	0.22%	4.88%
15 inch	0.15%	3.62%
18 inch	0.12%	2.83%
21 inch	0.10%	2.30%
24 inch	0.08%	1.93%
30 inch	0.06%	1.43%
36 inch	0.05%	1.12%

- b) Projects are to be constructed at the slopes shown on the CCU approved construction plans, unless otherwise approved by CCU.
- c) Minimum acceptable as-built slopes post construction has a tolerance of 5% of the minimum design slopes from above referenced table. Any other variance will require CCU approval.
- d) Changes in slope and direction shall only occur at manholes.
- e) Sanitary sewer services shall be installed at slopes not less than 0.63% and no more than 14%.

B. Location and Depth

- 1. Gravity mains shall be installed with straight alignment and uniform slope between manholes.
- 2. Manholes are to be located in the center of the roadway unless otherwise approved by CCU.
- 3. Manhole spacing may not exceed 500 feet.
- 4. Gravity mains are not to be installed through planting islands and/or cul de sacs islands, unless otherwise approved by CCU.
- 5. Gravity mains shall have a minimum 5 feet of cover to the top of the pipe unless otherwise approved by CCU.

- a) In all cases where 5 feet of cover cannot be achieved, the complete run between manholes shall be constructed of C-900 DR 18.

C. Design Considerations

1. Manholes shall be constructed at all changes in size, direction and/or termination of gravity mains.
2. Flow direction changes between 90 and 135-degrees at a manhole require a minimum line drop of 0.1 feet to be provided across the manhole.
3. Pipes entering manholes in line with flow channel or change in direction between 135 and 180-degrees, shall have a drop between 0.05-feet and 0.1-feet across the manhole.
4. A drop manhole connection shall be required for all inverts of 24 inches or more above the floor of the manhole, in accordance with CCU Gravity Sewer Standard Drawing Details.
 - a) All drop manholes shall have drop pipe outside of manhole.
 - b) Internal drop pipes are not allowed by CCU.
5. Unless a drop connection is installed, influent pipes shall match crown to crown at all manhole locations.
6. When a smaller sewer joins a large one, the invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient. An approximate method for securing these results is to place the 0.8 depth point of both sewers at the same elevation, as shown in CCU Gravity Sewer Standard Drawing Details.
7. Dead end manholes shall be extended past the last connecting property line to minimize lateral length.
8. Manholes shall not be located in drainage swales or any other low area likely to collect or pond water during rains, unless otherwise approved by CCU.
9. All master manholes are to be six feet in diameter and must be provided as follows:
 - a) Within 75 feet of the wet well at all new pump stations unless otherwise approved by CCU.
 - b) First manhole upstream of wet well.
10. Surge conditions downstream shall not be allowed in any gravity system design.

11. Service connections shall be installed at the locations shown in the approved drawings and per the CCU Gravity Sewer Standard Details.

- a) Service connections shall be made into gravity mains only, not directly into a manhole, unless otherwise approved by CCU.
- b) Service wyes shall be a minimum of 5 feet from either upstream or downstream manholes.
- c) A minimum of one (1) service connection shall be installed to service every property fronting a gravity sewer main.
 - (1) CCU prefers one (1) double service lateral for serving two (2) adjoining lots.
 - (2) If double service laterals are unfeasible, single service laterals for each lot may be designed and must be approved by CCU.
- d) Sanitary sewer clean-outs shall be required at the property line or at edge of utility easement, in accordance with the CCU Standard Drawing Details.
- e) Service connections shall be a minimum of 6" for all, single and double residential services, commercial, and industrial service.

D. Acceptable Pipe Materials

- 1. Please reference CCU Standard Specifications and Approved Products List for acceptable gravity sewer pipe materials.

E. Manholes

- 1. Please reference CCU Standard Specifications and Approved Products List for acceptable manhole materials.

F. Manhole Coatings

- 1. Please reference CCU Standard Specifications and Approved Products List for acceptable manhole coatings and specifications.

G. Manhole Frames and Covers

- 1. Please reference CCU Standard Specifications, Approved Products List, and CCU Standard Drawing Details for acceptable manhole ring and covers.

H. New Connections to Existing System

1. Any private wastewater system desiring to connect to CCU's sanitary sewer system must be completely turned over to CCU and meet all system and design requirements within this manual, unless otherwise approved by CCU.
 - a) Prior to acceptance by CCU, this wastewater system shall be tested and inspected by CCU in accordance with the CCU Standard Specification.
2. In no case shall substandard private systems or systems generating excessive inflow/infiltration, as determined by CCU, be allowed to connect into the County's system.
3. Any cost associated with this connection and upgrading to CCU's standards must be paid for by the private system owner prior to the connection being approved by CCU.
4. Connections to existing CCU manholes shall be as follows:
 - a) Core bore and seal manhole with rubber boot and stainless-steel strap.
 - b) Coordinate with CCU to verify the condition of the existing manhole's coating and re-coat if necessary.

3.4 GRAVITY MAIN TESTING

- A. Please reference CCU Standard Specifications for gravity sewer testing requirements.
- B. Televiwing
 1. All sanitary sewer gravity mains shall be televised at the Builder, Developer or Contractor's expense.
 - a) Televiwing may only be accepted if completed after the stabilized subgrade has been installed and satisfactory density tests have been submitted to CCU.
 - b) CCU must be notified 48-hours prior to televising of sewer main.
 - (1) CCU inspector attendance at TV taping is at the Utilities sole discretion.
 - c) Televiwing shall include rotating the camera lens to inspect the interior of each sewer lateral.
 - d) CCU reserves the right to request laterals be televised should staining or

foreign material be detected during the main line inspection.

(1) A CCU approved depth gauge and 5-inch mandril must be pulled in full view of the camera in all cases with verification of the mandril size before testing begins

(2) The maximum allowable vertical and horizontal deflection for gravity main pipe is 0.5 inches.

2. Prior to acceptance of the gravity main by CCU; the Builder, Developer, or Contractor shall provide CCU with a copy of the sewer tv tapes for review and approval.

C. Pipe Rounders

1. The use of pipe rounders for corrective action in gravity sewer mains is acceptable by CCU upon request.

3.5 **SEWAGE FORCE MAIN DESIGN**

This Section includes the general requirements for design and installation of pressurized sewage force mains.

A. Force Main Sizing

1. Force mains shall be of adequate size to efficiently transmit the total ultimate peak operational flow.

a) Force mains shall be 4-inch minimum diameter, unless approved by CCU.

B. Design Considerations

1. All piping shall be installed in accordance with the CCU Standard Specifications, pipe manufacturer's recommendations and approved engineering drawings.

2. Where pipe deflections are used, they are not to exceed 50 percent of the maximum deflection limits recommended by manufacturer, in accordance with the CCU Standard Specifications.

3. In order to provide adequate pipeline cleansing, force main flow velocity shall not be less than 2 fps at minimum pumping capacity, nor greater than 6 fps at ultimate maximum design pumping capacity.

a) With multiple pumping station systems or phased development, this minimum

velocity requirement may not be possible.

(1) When minimum velocities are not attainable, special attention to odor control and pipe cleanliness will be necessary.

(2) A meeting with CCU Staff will be required to discuss odor control and flushing programs.

b) Designs may be proposed to utilize smaller pumps in an interim situation with larger pumps to be installed at buildout with future phases. Pump replacement shall be at the expense of the developer. A minimum force main velocity of 2 fps shall be met during all phases.

4. For connection pressures to the existing system, please submit formal request to CCU at time of pre-application meeting with the Pre-Application Meeting Checklist.

C. Hydraulic Computations

1. Hydraulic computations also known as 'Head-Capacity Curves' will be required as follows:

a) For all developments connecting to a pressurized collection system,

b) For developments with contributor flow greater than 5,000 gallons per day connecting to existing low pressurized collection systems, and/or

c) When deemed necessary by CCU.

2. Hydraulic calculations shall be prepared for proposed force main systems in order to determine the various operational conditions as follows:

a) Hydraulic computations shall be done in accordance with industry standard engineering formulas.

b) Pipe friction loss shall be calculated using the Hazen-William's Formula.

c) A conservative coefficient of friction factor (C) of 120 shall be used for all pipes. This will assume all minor losses are accounted for.

d) The design engineer may use a more precise calculation using the following values for "K" coefficients to account for head losses in the system:

Fitting

Coefficient, K

Plug Valves (Fully Opened)	0.77
Swing Check Valves (Fully Opened)	2.50
90° Bends	0.80
45° Bends	0.20
Tees (Straight Run)	0.35
Tees (Branch Run)	1.28
Wyes (Straight Run)	0.30
Wyes (Branch Run)	0.50
Expansion Sudden $D2/D1 = 0.75$	0.19
Pipe Exit	1.00

- e) If a higher C-factor is required, the minor losses shall be calculated based on a per foot calculation as an average throughout the system with prior approval by CCU.
- 3. Hydraulic design computations shall be calculated using the most current version of software employed by CCU, or approved equal.
- 4. The effect of the proposed pump station on the hydraulic capacity of the existing sewer system must be evaluated prior to CCU approval for connection of the proposed pump station.
 - a) A hydraulic analysis must be performed to demonstrate that the increase in wastewater flow from the proposed pump station:
 - (1) Must not surcharge any existing gravity sewers,
 - (2) Must not reduce the design pumping capacity of all manifolded existing pump stations, and
 - (3) Must not cause the receiving pump station to exceed its design capacity.
- 5. For a force main system with only one pump station, the system's head capacity shall be calculated under peak hour flow conditions utilizing:
 - a) one pump running,
 - b) all pumps running, and
 - c) other combinations, if applicable.
- 6. System head capacity for force main systems with multiple pumping stations

manifolded together shall be calculated under the maximum head, i.e. wet well level of the proposed pump station set at the pump off elevation and under peak hour flow conditions, as follows:

- a) The design pump station is the only station on the system therefore, utilizing above-stated conditions.
 - b) All pump stations running with one pump running at each station.
7. If the project is phased, a final buildout master model shall be submitted with appropriate references to future phases.
 8. A CAD version of the final buildout master model shall be submitted at first site plan approval.
 9. A final wastewater hydraulic model (both hard copy and CAD files) with calculated results shall be provided for each project prior to approval.
 10. The complete list of required hydraulic computation submittals shall include, as applicable:
 - a) Project Overview, including overall map.
 - b) Wastewater Demand Calculations.
 - c) Proposed Phase Scenario.
 - d) Build Out Scenario.
 - e) Sanitary sewer pipe capacity calculations.
 - f) Lift station calculations including wet well sizing, wet well and switch elevations, head conditions, design flows, and force main piping.
 - g) Pressure at the force main connection point.
 - h) Pump selection.
 - i) Model pipe and junction outputs for all scenarios.
- D. Corrosion Protection
1. Installation of corrosion resistant pipe and material shall be at the discretion of CCU.
 2. If approved for use, exterior protection shall be provided for underground ductile iron pipe and fittings.
 - a) Polyethylene encasement shall be installed through the area of concern.

3. Steel pipe shall not be installed in severe corrosion areas.

E. Air Venting

1. Where the force main profile is such that air pockets or entrapment could occur, provisions for air release shall be provided.
2. Please reference Standard Specifications and Approved Products List for applicable material and manufacturer requirements.
3. Automatic air release assemblies shall be installed on all force mains at profile break points, such as tops of hills, where free flow will occur during operation or after pumping stops.
4. Automatic air release assemblies shall be installed at both ends of a direction drill.
5. Automatic air release assemblies shall be installed at both ends of a dip that includes 45-degree bends avoiding conflicts.
6. Air release valves shall be suitably housed in a properly vented assembly, as shown in the Standard Detail Drawings.

F. Location and Depth

1. Sanitary sewer force mains shall be installed along the edge of the road right-of-way or within a CCU Easement abutting the road right-of-way opposite of potable water mains unless otherwise approved by CCU.
2. Sanitary sewer force mains shall be designed to have 48-inch minimum cover to top of pipe for all direct bury, directional bore, and jack and bore installations.
3. Additional cover for avoidance of conflicts is subject to CCU approval.
4. All utility main separations shall be in accordance with CCU Standard Drawing Details. Any variance from standards shall be requested and approved at the discretion of CCU.
5. Valve Locations
 - a) Plug valves shall be installed in force main runs a minimum of every 1,000 feet unless otherwise approved by CCU.
 - b) Where force mains are to be extended, valves shall be placed at the future connection point to preclude line shutdown at the time of extension.

(1) Unless otherwise approved by CCU, these branches are to be restrained by methods other than thrust blocking in order to facilitate said connection without system shutdown.

6. Pressure Clean-Out Connections

a) Should force mains appear to be susceptible to sedimentation clogging created by depressed crossings or extended low flow and low velocity periods, suitable clean-out connections shall be provided every 400 feet, as requested by CCU.

(1) Clean-outs, such as plugged wye or tee fittings, shall be located to facilitate maintenance.

7. Terminal Discharge

a) To minimize turbulence and release of sewer gases, force mains shall enter the terminal facility (gravity sewer manhole or pumping station wet well) at a point just below the operational water level of said receiving unit.

b) For new force main connections to existing manholes or pump station wet wells, the developer must install an CCU approved liner/coating system for corrosion protection of the manhole structure.

c) For discharge of new force main flow into an existing CCU pump station wet well, the developer must install a new inline master manhole unless one already exists.

d) Any deviation from these above requirements must have prior approval from CCU.

G. Valves and Valve Boxes

1. Only eccentric plug valves are approved for use in sewage applications. The only exception is when wet taps are used to connect to existing force mains.

2. Cast iron valve boxes shall be provided for all valves installed underground which do not have extended operators such as is required for plug valves.

3. Valve boxes shall:

a) Have an interior diameter of not less than 5 inches,

b) Be adjustable to fit the designated depth of each cover over the valve,

- c) Be designed to prevent the transmission of surface loads directly to the valve or piping, and
- d) Be provided with covers marked with the word "SEWER".
 - (1) The covers shall be so constructed as to prevent tipping or rattling.

H. Restraining Devices

- 1. Restraining joints shall be placed at all bends, tees, plugs, reducers, and other fittings to provide lateral support.
- 2. Restraining joints shall conform to applicable sections within CCU Standard Specifications, Standard Details, and Approved Products List.
- 3. Concrete thrust blocks may be utilized as additional restraint with prior written approval by CCU.

I. Identification

- 1. Please reference CCU Standard Specifications for pipe identification and color as well as marker ball and marker tape placement, programming, and details.

J. Acceptable Pipe Materials

- 1. Please reference CCU Standard Specifications and Approved Products List for acceptable pipe materials.

K. Force Main Testing

- 1. Please reference CCU Standard Specifications for force main testing requirements.

3.6 **CASING INSTALLATION**

The provisions of this section shall represent the minimum standards and referenced sections for the design and installation of casing pipe for force mains as well as conditions requiring casing.

A. General

- 1. Casings shall be installed in accordance with permit conditions of the authority having jurisdiction.

B. Conditions Requiring Casing

- 1. When new roadways, turn lanes, acceleration lanes, deceleration lanes, or driveways are proposed; PVC or steel casing pipe with bell restraints and casing spacers shall be

installed on any proposed PVC main. **CCU requires replacement of all old and existing mains** to new PVC pipe to meet current standards.

2. New carrier pipe conditions which will require a casing are as follows:

Location	Carrier Pipe and Casing Material	
	PVC DR 18	DIP C 250
All Rights-of-Way, not under traveled way	none	none
Local Roadways and Collectors no more than 2 lanes		
Under Primary Travel Lane ¹	steel casing ³	steel casing ³
Under Secondary Travel Lane ²	steel casing ³	steel casing ³
Collector more than 2 lanes or Arterial Roadway		
Under Primary Travel Lane ¹	steel casing ³	steel casing ³
Under Secondary Travel Lane ²	steel casing ³	steel casing ³
Controlled Access, Expressway, and Freeway		
Under Primary Travel Lane ¹	steel casing ³	steel casing ³
Under Secondary Travel Lane ²	steel casing ³	steel casing ³
Railroads	steel casing ³	steel casing ³
Driveway or Access Drive		
For Institutional Sites (schools, hospitals, etc.)	steel casing ³	steel casing ³
For all others	none	none

Notes:

1. Includes condition where the carrier pipe crosses under both Primary and Secondary Travel Lanes together.
2. Condition where the carrier pipe is only under a Secondary Travel Lane.
3. Steel casing shall conform to the requirements of the Steel Casing Section of this Chapter.
3. In addition to the above, CCU reserves the right to require casings for new mains if conditions warrant and/or if deemed necessary.

C. Casing Pipe Installation

1. Please see CCU Standard Specifications and Approved Products List for installation specifics.

D. Casing Pipe Material

1. Please see the CCU Approved Products List for additional information on pipe material.

3.7 EXCAVATION, TRENCHING, BACKFILLING, AND RESTORATION

- A. Please reference CCU Standard Specifications for gravity sewer main and force main installation requirements.

3.8 PUMP STATION DESIGN

Developments shall be designed to minimize the number of pump stations required. Where possible, regional stations to service multiple developments shall be encouraged.

The Engineer shall comply with the design and installation requirements as specified by CCU and the Florida Department of Environmental Protection (FDEP).

A. General

There will be four classifications of lift stations by CCU

1. Private Pump Station
 - a) Stations are considered Private when there is one owner and only on connection to station
 - b) Stations are privately owned and not of operational or maintenance responsibilities of CCU.
2. Individual Pump Station
 - a) Stations are considered Individual when the design flows up to 10 ERC
 - b) Individual pump station site includes a 35'x35' easement
 - c) Individual stations include SCADA monitoring rather than telemetry – See Standard Specifications for more details
 - d) Individual stations include Grinder Pump Stations – See Section 3.10 for more details on Grinder Pump Stations
3. Standard Pump Station
 - a) Stations are considered Standard when multiple units flow to one station
 - b) Standard Pump Station site includes a 35'x35' easement
 - c) Standard Pump Stations have maximum wetwell depth of 25'
 - d) Standard Pump Station includes Data Flow Systems, Inc. telemetry control unit
 - e) A standard station does not require odor control equipment to be installed but space for future additions is needed. See Standard Drawing Details for necessary layout.
 - f) Standard stations electrical panel is required to have standard generator hookup
4. Master Pump Station
 - a) See section 3.11 for more details on Master Pump Stations
 - b) Master Pump Station site includes a 50'x50' easement
 - c) Master Pump Stations have maximum wetwell depth of 30'
 - d) Master Pump Stations need to adhere to Cmom Criteria
 - (1) Weather Station
 - (2) Groundwater monitoring station
 - (3) Flow Meter (leave space for)

- e) All master pump stations are to be equipped with adequately sized odor control units, in accordance with the Approved Products List and approved by CCU.
 - f) All master pump stations are to be equipped with adequately sized standby emergency generators.
5. Pumping stations with a design peak hour flow of 1500 gpm or less shall include a minimum of two (2) pumps.
 6. Pumping stations with a peak hour design flow exceeding 1500 gpm shall include three (3) or more pumps.
 7. New projects with more than one (1) proposed pump station shall provide a master pump station so that only one connection is required to the existing force main. All proposed pump stations on a project shall pump to the master station within the project boundary.
 8. Any lift station with a design wastewater flow of twenty (20) equivalent residential units (ERU) or more must have a standby diesel power generator and an automatic transfer switch on site.
 - a) Any other lift station not falling into the above criteria shall be equipped with standby power generator connections for emergency auxiliary pumping.
 - b) Backup generators need to be dual voltage to handle 120v, 240, and 480v pump station ratings.
 9. All pump stations shall be designed such that the design peak hour flow can be pumped with the largest pump out of service.
 10. The selected sewage pump system shall be capable of pumping the design peak hour flow at the maximum computed system total head requirements.
 11. CCU reserves the right to request that proposed sewage pump stations intended to serve a single building or tract of land and that do not provide a regional benefit be constructed as privately owned and maintained pump stations.

B. Wet Well Design

1. The wet well shall be circular and constructed per CCU Standard Specifications.

2. All structures shall be constructed level and plumb.
 - a) Sections are to be installed in true alignment, with a $\frac{1}{4}$ inch maximum tolerance per section.
3. Wet wells shall provide sufficient space for equipment and required suction pipe submergence.
 - a) The inside diameter of the wet well shall not be less than 6 feet for Individual stations and 8' for Master stations, unless otherwise approved by CCU.
 - (1) For lift stations with 20 HP pumps or greater, wet well diameter shall not be less than 8 feet.
 - b) 4-foot diameter wet wells will be acceptable for individual stations.
4. Wet Well Liners and Coatings
 - a) Please refer to Standard Specifications and Approved Products List for additional information regarding wet well liners and coatings.
5. In general, the normal operational water level shall provide positive suction head for the pumps.
6. Operating volume in wet well shall be enough to ensure a minimum pump run time of two minutes.
7. The following are the suggested initial settings for wet well liquid level sensors:
 - a) Low Level/All pumps off - 2.5 feet below poured invert of wet well or written approval provided by CCU.
 - b) Lead pump on - distance above low level/all pumps off sensor required to achieve optimal operating volume.
 - c) Lag pump on - one foot above lead pump level.
 - d) High water level alarm - six inches above lag pump on and a minimum of three inches below influent pipe invert.
 - e) The redundant control high level float shall be installed to operate anytime the liquid level is at the incoming pipe invert.
8. In designing wet wells, the following three limitations must be observed:
 - a) One pump running in a duplex pump station must have the capacity to pump the

peak hour flow.

b) Under average daily flow conditions, it is desirable to set the pump cycle time to pump out the wet well every 6 to 15 minutes to prevent septic conditions.

(1) Pump cycle time is defined as the time required to:

a. Fill the storage volume in the wet well from the pump “Off” level to the Lead Pump “On” level plus

b. The time required to pump down the wet well to the Pump “Off” level.

(2) The maximum number of cycles per hour shall be 10 or 6 minutes per cycle.

(3) For a duplex pump station, the number of pump starts will be one half of the calculated cycles per hour as a result of pump alternation.

c) Pump Cycles

(1) Under average daily flow conditions, the time for one pump cycle is given by the equation:

$$T_{Avg} = \frac{V_{ww}}{(QDP - QAI)} + \frac{V_{ww}}{QAI}$$

Where:

T_{Avg} = Time for one pump cycle under average flow conditions (in minutes)

V_{ww} = Storage volume in the wet well from Lead Pump “On” level to Pump “Off” level (in gallons)

QDP = Design pumping rate (gpm)

QAI = Average flow into wet well (gpm)

(2) Under peak hourly flow conditions, the time for one pump cycle is calculated as the pump down rate with zero inflow and then refilling of the wet well at peak hourly flow conditions immediately after the pump shuts off. This will result in maximum cycles per hour for the pump station.

a. The time for one pump cycle under peak hourly flow conditions is given by the equation:

$$T_{Peak} = \frac{V_{ww}}{QDP} + \frac{V_{ww}}{QPI}$$

Where:

T_{Peak} = Time for one pump cycle under peak hour flow (in minutes)

V_{ww} = Storage volume in the wet well from Lead Pump “On” level to
Pump “Off” level (in gallons)

Q_{DP} = Design pumping rate (gpm)

Q_{PI} = Peak hourly flow into wet well (gpm)

C. Pumps And Motors

1. Multiple pumps shall be provided. Where only two pumps are provided, they shall be of the same size. Pumps shall have capacity such that peak hour flow can be pumped with the largest pump out of service.
2. Pumps shall be designed to facilitate easy removal and replacement for inspection or maintenance purposes without personnel entering or dewatering the wetwell.
 - a) There shall be no bolts or other fastening to be removed.
 - b) CCU personnel shall not need to enter the wet well.
3. Pumps shall be:
 - a) non-clog,
 - b) mechanical seal,
 - c) capable of handling raw, unscreened sewage, and passing a sphere of at least 3-inches in diameter.
4. Pumps shall provide the required peak design performance.
 - a) They shall be suitable for operation within the total hydraulic range of operation without overloading the motors.
5. Pump stations with 20 HP motors and greater require soft starters.
6. Grinder pump stations and pump stations with less than 20 HP motors may benefit from variable frequency drives (VFD). CCU will specify when they are required.

D. Piping Design

1. Pump station piping shall have the same requirements as those for force mains except that PVC or HDPE shall be utilized within the wet well structure.

2. Pump station piping shall be above ground unless otherwise approved by CCU.
3. Each sewage pump shall have individual piping.
4. Each individual pump discharge pipe shall be equipped with:
 - a) An air release valve,
 - b) A check valve, and
 - c) An eccentric plug valve.
 - (1) The eccentric plug valve shall follow the check valve to facilitate shut-off.
 - (2) It is to be located prior to the connection into the station header and force main.
5. All pipes discharging into the wet well shall be designed for submerged discharge below the lead pump “pump-off” level.
 - a) This may be accomplished using a drop pipe connection.
6. Where pipes are to extend into or through structures from the exterior, flexible connections (mechanical or push-on type joints) shall be provided at the exterior wall face.
7. Flexible connections such as flanged coupling adapters, expansion joints and couplings, etc., shall be provided within flanged piping systems in order to provide for:
 - a) expansion and contraction,
 - b) differential settlement,
 - c) and/or to expedite installation and maintenance.
8. Special consideration shall be given to the support and restraining of piping systems where flexible connections are used.
 - a) This requirement shall apply to both interior and exterior systems.

3.9 **PUMP STATION GENERAL REQUIREMENTS**

A. Site

1. Pump Stations shall be installed outside of any road right-of-way.
2. The site shall meet the setback requirements per Charlotte County Land Development Code.
3. Pump station sites shall have adequate area provided for operation and

- maintenance of facility.
4. The siting of all pump station facilities shall be subject to review and approval by CCU.
 5. All pump stations shall be located on a separate parcel of land or within a utility easement.
 - a) An easement for ingress and egress to the pump station and an easement for the pump station must be granted and recorded before the pump station can be accepted by CCU for operation and maintenance.
 6. The pump station shall be sited with consideration of the neighborhood, surrounding site features, landscaping, aesthetics, safety, and security.
 7. A master manhole must be provided within 75 feet of the wet well.
 - a) This manhole shall have only one effluent pipe to the pump station.
 8. Pump station sites are to be well drained.
 - a) The wet well top slab and rim elevation must be set at or above the elevation determined from the 100-year flood level.
 - b) The bottom of the electrical panel must be set at or above the elevation designated by the FEMA 500-year flood level.
 9. For operation and maintenance purposes, pump station sites are to be readily accessible by CCU vehicles and shall include:
 - a) A 16-foot wide paved or concrete driveway with no more than a 2% slope in either direction.
 - (1) Driveway is to be designed to drain water away from the pump station site.
 - b) Two 8-foot wide swing gates.
 - c) A 6-foot tall chain link fence with black vinyl coating.
 - d) An 8-inch thick concrete slab.
 - e) Geotechnical fabric with 6 inches of compacted #57 stone.
 10. Sufficient lighting shall be provided for nighttime emergency, as shown in the Standard Detail Drawings.
 - a) Provide a 15-foot-tall aluminum light pole.
 - b) The lamp shall be a 250-watt halogen lamp.

11. All sewage pump stations shall be provided with a reclaim water service if available and reduced pressure cross connection assembly.
 - a) A conveniently located brass or copper hose bib shall be provided to facilitate wet well wash down.
 - (1) The hose bib is to be mounted on a 4" x 4" precast concrete post secured by stainless steel straps located adjacent to the cross-connection assembly.

B. Pump Station Power

1. An Electric Meter shall be supplied by the company providing power to the station.
2. A separate Power Disconnect Switch shall be provided at each pump station.
 - a) The Disconnect Switch is to be located in line immediately after the power meter and before the control panel.
 - b) The switch shall be consistent with the Approved Products List.
 - c) All electrical gear, including generators shall be set above the 100-year flood elevation to the bottom of the box and/or generator.
3. Electric Panels
 - a) Electric Panels shall be of the type recommended by the pump manufacturer and shall be compatible with the requirements of the pumping operation.
 - b) Each shall include provisions for:
 - (1) Turning pumps on and off, manually and automatically,
 - (2) Alternating lead pump with each pump cycle or manually,
 - (3) Indications for operation and alarm conditions,
 - (4) Testing and indication of all operational features,
 - (5) Terminal strip wired and indicated for all SCADA contacts,
 - (6) Spare a minimum of eight terminal strip contacts to allow for expansion, repair and/or alterations.
 - c) All pump stations operating on 480 V shall include appropriately sized transformer to step down the voltage to 120 V to accommodate a minimum of 20-amp circuit in the receptacle.
 - d) All wiring shall be color coded and numbered as shown in the CCU Standard Drawing

Details.

- e) A waterproof wiring schematic showing the color-coded wiring and corresponding descriptions shall be affixed to the inside of the pump control panel door.
 - f) A lightning arrestor is to be provided sized for voltage, current and phase for particular installation as approved by a licensed electrical engineer.
 - (1) The lightning arrestor is to be mounted on the outside bottom of the disconnect box.
 - g) Pump stations not supplied with emergency generators on site shall include a service generator receptacle of the type and size sufficient to operate all necessary equipment and connect to power via CCU portable generators.
4. Please see CCU Standard Specifications, Standard Drawing Details, and Approved Products List for additional information.

3.10 Grinder Lift Stations

This section is intended to describe the requirements for Grinder pumping stations that serve minimal flows from a development source. The station and force main will be owned and operated by CCU. All infrastructure shall meet the same requirements as the Individual Pump Station section.

- A. The stations shall be designed to meet all pertinent CCU, FEDP, and Ten State Standards for Plumbing and Electrical codes.
- B. The station shall be designed to pump at a pressure ranging from 5 psi to 70 psi to deliver the wastewater flows to the Utilities sewer connection point.
- C. The station shall be designed to provide a sealed system to eliminate infiltration and inflow as well as unauthorized access.
- D. The system shall include a shut off valve at the property line, prior to connection with the CCU infrastructure.
- E. CCU shall review and inspect the station to ensure conformance with the Standard Specifications and that it will operate and function properly.
- F. CCU shall inspect the following portions of the Grinder Pump Station prior to a Certificate of

Occupancy being issued for the project.

1. Station start-up to ensure system operates properly
2. Inspection of valves to ensure proper placement and operation
3. Inspection of station to ensure proper seal to prevent infiltration and inflow.

3.11 **MASTER PUMP STATIONS**

Master pump stations shall include all components required for standard pump stations, however, they shall also include the following:

1. Master stations are those either repumping flows from another pump station or with a discharge pipe 12-inches or greater in diameter.
2. Master stations shall include a Data Flow Systems, Inc. telemetry control unit, groundwater level monitoring, and a weather station.

A. Ventilation and Odor Control Facilities

1. Forced draft mechanical ventilation shall be provided for all wet wells where free access is required for operating equipment maintenance and/or inspection.
 - a) Wet wells without free access shall be ventilated with a minimum of one 4-inch diameter open vent pipe.
2. All vents shall be a minimum of 2 feet above the 500-year flood levels in flood zones set by FEMA or other competent authority.
3. Ventilating fans or blowers, ductwork and other appurtenances shall be installed in accordance with the CCU Standard Specifications and Approved Products List.
4. Odor control equipment shall be required for all wet well air concentrations with expected hydrogen sulfide air concentrations exceeding 10 ppm on the average.
5. Odor control equipment and methods shall be per the CCU Approved Products List.

B. Emergency Generators

1. Emergency generators are to be engine type of adequate size to automatically start and operate the pumps required for design flow conditions, lights, controls, and other critical items.
2. Master pump stations are required to have a permanent generator. If there is only one additional lift station, that is the only required generator.

- a) If there is a master pump station and two to four additional pump stations, one portable generator is required.
 - b) If there is a master pump station and more than four additional pump stations, two portable generators are required.
3. The generator installation shall be in accordance with all applicable manufacturers' requirements and CCU Standard Specifications.
- In order to minimize noise levels, the generator must also be equipped with a noise reduction package that must first be approved by CCU. Residential mufflers are recommended.

3.11 **LOW PRESSURE SEWER**

Low Pressure Sewer systems are prohibited for all new development but may be allowed in areas that have existing systems in need of extension for additional or adjacent units.

A. General

1. This section sets forth the general requirements for design, and installation of low pressure sewer system extensions.
2. For low pressure sewer system materials, please see CCU Standard Specifications, Standard Drawing Details and Approved Products List.
3. The sewer mains shall be located, to the greatest extent possible, in areas where damage is less likely and disruption to the neighborhood is minimized.
4. Please see CCU Standard Specifications for air release valves.
5. Boxes and vaults for air release valves, cleanouts and other appurtenances shall be sized to permit easy removal and permit operations of the valves. Covers shall be marked per CCU Standard Drawing Details.
6. Please reference CCU Standard Specifications for pipe identification and color as well as marker ball and marker tape placement, programming, and details.

B. Connection to Pressure Sewer Main

1. Please reference CCU Standard Drawing Details for LPS connections.
2. All low-pressure connections to gravity sewer systems shall be made at a manhole and enter at the existing invert to minimize turbulence of flow and the release of hydrogen

sulfide gas. If the low-pressure sewer main cannot enter at the existing invert, then a restrained joint inside drop must be constructed per CCU standards.

3. If the low pressure tank installation is within seven (7) feet of vehicular traffic or parking, a load bearing tank and appurtenances shall be required per CCU Standard Specifications, Standard Drawing Details, and Approved Products List.

3.12 **VACUUM SEWER**

A. General

1. This section sets forth the general requirements for design, and installation of vacuum sewer system extensions.
2. For vacuum sewer system materials, please see CCU Standard Specifications, Standard Drawing Details and Approved Products List.

B. Vacuum sewer systems are allowed to be extended from existing systems within planned vacuum sewer service areas. Extension to be approved by CCU.

C. No new vacuum sewer systems allowed for new developments.

SECTION 4

RECLAIMED WATER SYSTEMS

4.1 GENERAL

This section sets forth the general requirements for design of reclaimed water distribution systems for irrigation service. Additional information can be found in the General Requirements, Standard Drawings Details, and Standard Specifications. Utility shall not guarantee flow or system pressure.

4.2 SYSTEM DESIGN

The Engineer shall comply with the design and installation requirements as specified by Charlotte County Utilities and the Florida Department of Environmental Protection. If pressures are not adequate, it is the developer's responsibility to install booster pumps to ensure onsite pressure meet design requirements and ensure mains are sized appropriately for booster pumps not to cavitate.

The cost of all work associated with making connections to the existing system shall be paid for by the Contractor.

A. Flow Demands

1. Flow demands for design shall be calculated on the basis of full development as known or projected.
2. Irrigation Flows shall be calculated as 1 inch per acre per week for pervious areas only.
3. A separate reclaimed water meter must be utilized for this purpose. (See most currently adopted Rate Resolution for meter sizes and fees).

B. Valves and Valve Locations

1. Gate Valves shall be furnished and installed per CCU Standard Specifications and the Approved Products List.
2. Gate valves shall be provided at all locations necessary to provide an operable, easily maintained, and repaired reclaimed water distribution system including but not limited to:
 - a) Pipe terminations,
 - b) All intersecting reclaimed mains,
 - (1) The number of valves at connection points shall be one less than the number of legs, and
 - (2) Valves shall be placed at extension of right of way lines.

- c) On both sides of all subaqueous crossings.
- 3. The maximum length of reclaimed water main between valves which can be used for shutting down the line for repair work shall not exceed, unless otherwise approved by CCU:
 - a) 1,000 feet for all transmission mains,
 - (1) All mains over 16" are considered to be transmission mains.
 - b) 500 feet in commercial and industrial areas, and
 - c) 1,000 feet in residential areas.
- 4. Valves may only be operated by CCU staff or someone under the direct supervision of CCU staff.

C. Pipe Depth

- 1. The standard minimum cover for reclaimed water mains shall be in accordance with CCU Standard Specifications.
- 2. Reclaimed water main is intended to be installed at consistent cover. Deviation of conflict are subject to approval for CCU.
 - a) 48 inches from the top of pipe to finished grade for 6-inch through 12-inch pipes, and;
 - b) Minimum 66-inch depth from the top of pipe to finished grade for pipe sizes greater than 16-inch (Final depth subject to valve requirements).
- 3. No side actuated valves are allowed.
- 4. Additional cover for avoidance of conflicts is subject to CCU approval.
- 5. Directional Drilling, other than under waterways, shall be installed at depths of 4 to 8 feet.
 - a) In a manner to minimize air pockets, depths greater than 8 feet will not be accepted. Any exceptions must be approved by CCU.
 - b) For additional information, please see CCU Standard Specifications.
- 6. Vertical and horizontal deflections shall be accomplished with the least amount of bend possible. Pipe deflection is preferred over 11.25-degree bends. 11.25-degree bends are preferred over 22.5-degree bends. 22.5-degree bends are preferred over 45-degree bends. Provide table showing amount of deflection per distance accomplished by each.

7. ARVs are required at highpoints in the system or as required by CCU during review.

D. Air Release Valve

1. Where the effluent reclaimed main profile is such that air pockets or entrapment may occur which could result in flow blockage, methods for air release shall be provided.
2. At critical points on major mains automatic air release assemblies shall be installed.
3. All dead-end effluent reclaimed mains, whether temporary or permanent, shall be equipped with a manually operated blow-off at the terminal.
4. Refer to CCU Standard Specifications and the Approved Products List.
5. See Standard Drawing Reclaimed Water Details for Approved Air Release Valve detail.
6. Odor control shall be placed with all reclaimed water ARVs, per the Standard Specifications and Standard Drawing Details.

E. Joint Restraining

1. Pipe restraints shall be in accordance with CCU Standard Specifications and Standard Drawing Details.

F. Electrolysis Prevention

1. All systems shall be designed to best avoid electrolytic action through the contact of dissimilar metals.
2. Preventative action, if required by CCU, may consist of installing insulating or dielectric couplings between the two materials.

G. Identification

1. See CCU Standard Specifications for pipe color and identification.
2. See CCU Standard Specifications for marker ball and marker tape requirements, as well as installation and programming requirements.

H. Backflow Prevention

Any property which is served by the Charlotte County Utilities potable water which also utilizes reclaimed water shall provide for a backflow prevention device at the customer's water service connection in accordance with the Charlotte County Utilities Cross Connection Control Policy.

I. Effluent Reclaimed Storage

It is the intent of the Charlotte County Utilities that all large use customers shall provide on-site storage in the form of tank (s) (with air gap) or pond (s), for the delivery of Effluent Reclaimed. Storage capacity of the on-site facility shall be reviewed and accepted by Charlotte

County Utilities.

4.3 CONNECTION TO EXISTING SYSTEM

1. All connections to existing mains shall be made as authorized by CCU.
2. A representative of CCU must be present at all tie-ins and wet taps.
 - a) Forty-eight hours advance notification is required.
3. Valves separating the mains being installed from existing mains shall be operated by or under the direction of CCU.
4. In the event any existing customers will be without water while a connection is being made; the Contractor shall notify them 72 hours in advance of when the water will be turned off and when he estimates service will be resumed.
 - a) These connections shall be made during the day unless an alternate tie-in time is approved by CCU.

4.4 MATERIALS

- A. Please refer to the CCU Standard Specifications and Reclaimed Water Mains and Approved Products list for acceptable material and types and product information.
- B. HDPE is only to be used in trenchless installation applications or as otherwise approved by CCU.
- C. Fusible PVC is not an acceptable pipe material in Charlotte County.

4.5 TAPPING SLEEVES

- A. Tapping sleeves used to make "wet" taps into existing mains shall follow CCU Standard Specifications.
- B. Tapping sleeves shall be constructed with materials on the CCU Approved Products List.
- C. No size on size allowed. If similar size mains are proposed to be connected, a cut in tee will be necessary.
 1. When other types of pipelines are encountered, the proposed tap shall be at least 2 diameter inches smaller than the diameter of the existing pipeline unless otherwise approved by CCU.

4.6 RECLAIMED WATER METER

- A. Install reclaimed water meter assembly per CCU Standard Specifications Reclaimed Water service details.
- B. All meters are to be furnished and installed by CCU refer to CCU Standard Specifications.

4.7 VALVE BOXES

A. Refer to CCU Standard Specifications and the Approved Products List.

4.8 REDUCING, PRESSURE SUSTAINING, AND CHECK VALVE

- A. This valve shall maintain a constant downstream pressure regardless of fluctuations in demand. When the upstream pressure becomes equal to the spring setting of the pressure sustaining control, the valve throttles to maintain a constant inlet pressure. If the downstream pressure is greater than the upstream pressure, the valve closes automatically to prevent return flow. Solenoid control shall intercept pressure reducing control to close/open main valve. This valve shall be hydraulically operated.
- B. The pressure reducing pilot control shall be a direct-acting, adjustable, spring-loaded, normally closed diaphragm valve which closes when downstream pressure exceeds the spring setting.
- C. The pressure sustaining pilot control shall be a direct-acting adjustable, spring-loaded, normally closed diaphragm valve which opens when upstream pressure exceeds the spring setting. The control system shall include a strainer orifice assembly, and an adjustable opening speed control.

4.9 SERVICE CONNECTIONS

A. Refer to CCU Standard Specifications and the Approved Products List for service connection information and details.

4.10 CASING INSTALLATIONS

The provisions of this section shall represent the minimum standards and referenced sections for the design and installation of casing pipe for water mains as well as conditions requiring casing.

A. General

1. Casings shall be installed in accordance with permit conditions of the authority having jurisdiction.

B. Conditions Requiring Casing

1. When new roadways, turn lanes, acceleration lanes, deceleration lanes, or driveways are proposed; PVC or steel casing pipe with bell restraints and casing spacers shall be installed on any existing PVC main. CCU requires replacement of all old mains for existing mains.

2. New carrier pipe conditions which will require a casing are as follows:

	Carrier Pipe and Casing Material
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Location	PVC DR 18	DIP C 250
All Rights-of-Way, not under traveled way	none	none
Local Roadways and Collectors no more than 2 lanes		
Under Primary Travel Lane ¹	steel casing ³	steel casing ³
Under Secondary Travel Lane ²	steel casing ³	steel casing ³
Collector more than 2 lanes or Arterial Roadway		
Under Primary Travel Lane ¹	steel casing ³	steel casing ³
Under Secondary Travel Lane ²	steel casing ³	steel casing ³
Controlled Access, Expressway, and Freeway		
Under Primary Travel Lane ¹	steel casing ³	steel casing ³
Under Secondary Travel Lane ²	steel casing ³	steel casing ³
Railroads	steel casing ³	steel casing ³
Driveway or Access Drive		
For Institutional Sites (schools, hospitals, etc.)	steel casing ³	steel casing ³
For all others	none	none

Notes:

1. Includes condition where the carrier pipe crosses under both Primary and Secondary Travel Lanes together.
2. Condition where the carrier pipe is only under a Secondary Travel Lane.
3. Steel casing shall conform to the requirements of the Steel Casing Section of this Chapter.

C. In addition to the above, CCU reserves the right to require casings for new mains if conditions warrant and/or if deemed necessary.

D. Casing Pipe Installation

- a) Please see CCU Standard Specifications and Approved Products List for installation specifics.

E. Casing Pipe Material

- a) Please see the CCU Approved Products List for additional information on pipe material.

4.11 TESTING

- A. Please Reference CCU Standard Specifications.