This Code officially adopts
THE BAHAMAS BUILDING CODE
CURRENT EDITION
Produced by
Ministry of Public Works & Transport
Government of The Bahamas

with additional provisions as
contained in this supplement
February 2010

With Subdivision Requirements and Road Construction Details.
1. **AUTHORITY**: This Building and Sanitary Code is adopted under the authority of the Hawksbill Creek, Grand Bahama Deep Water Harbour and the Industrial Area Act, 1955.

2. **JURISDICTION**: This Code – The Bahamas Building Code together with the additional provisions contained in this supplement, applies to all areas within the boundaries of the Port Area, as the City of Freeport/Lucaya.

3. **PERMISSION**: Permission to use the Bahamas Building Code was given to the Grand Bahama Port Authority, Limited by the Government of the Bahamas via the permanent secretary, Mr Colin Higgs, in the Ministry of Public Works and Transport on 25th June, 2010. The Minister, pro tempore, is the Hon. Neko C. Grant.

4. **LIMITED CONDITIONS**: Nothing contained in the supplement of additional provisions shall cause the provisions of the Bahamas Building Code to be relaxed.

5. **EFFECTIVE DATE**: This Code becomes effective on the first day of January 2012.

6. **MINIMUM STANDARDS**: It must be stressed that the standards prescribed by this Code are minimum standards and compliance with them will not absolve from liability any owner or occupier of a lot if the terms of the lease, conveyance, or title deed under which he owns or occupies such lot prescribe any higher standards.

The Building and Sanitary Code is dedicated to promote and safeguard basic standards of safety, health and conveniences and to guide the orderly development and growth of the community for the mutual benefit and comfort of all its inhabitants.
In addition to the Code Items contained in the Bahamas Building Code – Current Edition, and to the additional provisions contained herein, all Freeport Byelaws and the Planning and Development Code (once ratified by the Government of the Bahamas) and The Environmental Code (once ratified by the Government of the Bahamas), must apply to all development within the Port Area.

Additional Provisions contained herein were prepared by:

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A. Reading The Code

This supplement to the Bahamas Building Code should be read in the sequence outlined below:

1. Determine the chapter from The Bahamas Building Code then immediately search for the corresponding chapter in this supplement document to determine whether additional changes exist.

2. All information given in this additional supplement supersedes what may be contained in the Bahamas Building Code.

3. Refer directly to supplement document for Subdivision and Infrastructural Development under the subheading SUBDIVISION PROCEDURE & ROAD CONSTRUCTION/REPAIR DETAILS.

4. In every instance, the term New Providence is synonymous with Freeport/Lucaya.

5. In every instance, the term City of Nassau is synonymous with the City of Freeport/Lucaya.

6. In every instance, the term BCO is synonymous with the Director of Building and Development Services of The Grand Bahama Port Authority, Limited.

7. In every instance, the term Minister is synonymous with the Director of Building and Development Services of The Grand Bahama Port Authority, Limited.

8. In every instance, the term Minister of Health is synonymous with the Director of Building and Development Services of The Grand Bahama Port Authority, Limited except with matters pertaining directly to the Government’s Department of Health in which case the Minister of Health means the Minister of Health.

9. In every instance, the term Minister of Tourism is synonymous with the Director of Building and Development Services of The Grand Bahama Port Authority, Limited.

10. In every instance, the term Minister of Compliance is synonymous with the Director of Building and Development Services of The Grand Bahama Port Authority, Limited.

11. In every instance, the term Chief Fire Officer is synonymous with the Director of Building and Development Services of The Grand Bahama Port Authority, Limited.

12. In every instance, the term Chief Labour Officer is synonymous with the Director of Building and Development Services of The Grand Bahama Port Authority, Limited.

13. In every instance, the term Development Agent is synonymous with The Grand Bahama Port Authority, Limited.

14. In every instance, the term Physical Planning Department is synonymous with the Planning Department of The Grand Bahama Port Authority, Limited.

15. In every instance, the term Bahamas Electricity Corporation is synonymous with the Grand Bahama Power Company or its successor.

16. Lettering in “red” represents changes from the Bahamas Building Code.

17. Lettering in “blue” represents deletions from the Bahamas Building Code.

The information contained herein would reflect only the required modifications to the Bahamas Building Code.

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CHAPTER 1

103 SCOPE

103.1 New buildings and structures hereafter erected in The Commonwealth of The Bahamas, and in the City of Freeport / Lucaya in Grand Bahama Island, shall conform to the requirements of this Code.

106 CONNECTED LEGISLATION


(b) The Local Government Act 1996, which supersedes any Extension orders to the Out or Family Islands, made under (a), (b) or (c) above. (Not Applicable to Freeport)

(c) The Professional Architects Act 1994 and as revised.

(d) The Professional Engineers Act 2004 and as revised.

(e) The Land Surveyors Act and as revised.

(f) The Hawksbill Creek Agreement 1955.

(g) The Freeport Bye-laws 1965.
CHAPTER 2

DEFINITIONS

AGENT: -
   An Architect, Engineer, Contractor, Professional Specialist with reasonable
evidence, or other person nominated in writing by the owner to represent the
owner of a project for which a building permit is being sought or for which a
project is being developed.

ARCHITECTURAL TECHNICIAN: -
   An Architectural Technician registered with the Professional Architects Board
under the Professional Architects Act 1994.

DEVELOPMENT AGENT: -
   The Director of the Building & Development Services Department of The Grand
Bahama Port Authority, Limited who is charged with the responsibility for the
administration of the Building Code or his representative.

DIRECTOR: -
   The Director of the Building & Development Services Department of The Grand
Bahama Port Authority, Limited who is charged with the responsibility for the
administration of the Building Code.

GBPA: -
   The Grand Bahama Port Authority, Limited.

LICENSED: -
   Implies licensed by The Grand Bahama Port Authority, Limited to offer
services in a specific discipline within the city of Freeport/Lucaya.

PERMIT HOLDER: -
   The name under which a building permit is issued – an owner or his/her agent.

PROFESSIONAL ARCHITECT: -
   An architect registered with the Professional Architects Board under the

PROFESSIONAL ENGINEER: -
   An Engineer registered with the Professional Engineers Board under the
   Professional Engineers Act 2004.

REGISTERED LAND SURVEYOR: -
   A land surveyor registered with the Land Surveyor’s Board under the Land
   Surveyors Act, 1975.
CHAPTER 3

APPLICATION TO BUILD -NOTICES AND INSPECTIONS

302 APPLICATION TO BUILD

(a) Every application for a permit shall be made in writing on the official application forms obtainable from the offices of “Building & Development Services Department of The Grand Bahama Port Authority, Limited in Freeport, Grand Bahama” or from the office of the Administrator in the case of a Family Island application, and the application shall contain all the information required to complete the forms. The application shall be signed by the applicant or by his agent.

(b) PERMIT APPLICATION

APPLICATION FORM:
(a) Each application shall include the following information – (see facsimile of “Building Permit Applications” form in the Appendix D).
1) A legal description and address of the land on which the work shall be done.
2) The use of occupancy of the building or structure.
3) The value of the proposed work.
4) Estimated time of construction.
5) Other information as required by the Development Agent to describe the proposed work.

(b) Each application shall be accompanied by plans and specifications as required by this Code.

APPLICATION CHANGES:
In the event of a change in any material fact given in the application, which served as a basis for issuing the permit, the permit holder shall immediately file an amended application detailing such changed conditions.

PLANS AND SPECIFICATIONS:
(a) General: Each application for a permit shall be accompanied by two sets of plans and specifications, except the Development Agent may issue a permit without plans and/or specifications for small or unimportant work for non-structural nature.
(b) Required Information:
1) Plans shall be drawn to a scale which indicates with sufficient clarity the nature and extent of the work proposed.
2) Plans and specifications together shall contain sufficient information to indicate that the work proposed will conform to the provision of this Code. Such information shall be specific and this Code shall not be cited in whole or part as a substitute for specific information.
3) The Development Agent may require computations, stress diagrams, shop drawings, test results, additional details or other data necessary to show
compliance with this Code, or verify the sufficiency of plans and specifications.

4) Plans and specifications shall be identified with the address of the work, the name and address of the owner, and address of the person or persons who prepared them.

5) Plans shall include a site plan prepared by a registered land surveyor licensed by The GBPA on which shall be clearly indicated the property boundaries and dimensions, critical elevations, existing structures, rights of way, easements, street and property zoning, general block or area plans, and legal description of property, except that the Development Agent may not require such site plan if property stakes are existing and the work involved is minor and/or is clearly within the building lines.

6) Architectural drawings shall include:
   i. Architectural floor plans for each floor and building roof plan including a tabulation breakdown of stress of each floors.
   ii. Exterior elevations of all walls.
   iii. Typical sections through entire building.
   iv. Typical wall sections to large scale,
   v. Foundation plan.
   vi. Structural framing plan each floor and roof.
   vii. Columns, beams, and footing schedule and typical details.
   viii. Electrical plan showing lighting and electrical
   ix. Tabulation of electrical load and riser diagram.
   x. Plumbing plan.
   xi. Plumbing isometric.
   xii. Septic tank or sewage disposal unit and location.
   xiii. Mechanical plans as required if building is air conditioned, refrigerated, etc.
   xiv. Telephone layout on projects of over 8 units or large commercial buildings.
   xv. Landscaping proposals and site layout plans.
   xvi. Parking layout.
   xvii. Details of all special conditions, e.g. connections to existing structures.

(c) Preparation of Plans:
   (a) All applications for Building Permits whether for new or existing buildings if costing over $10,000 shall be signed or bear the impress of the seal of a licensed professional architect or architectural technician in accordance with the Architects Act 1994. Where such work is preponderantly a specialist field then the plans shall bear the seal or signature of a registered qualified specialist in that field.
   (b) Where the plans contain work of an architectural nature combined with either structural, electrical, or mechanical designs other than those of a minor nature, the Development Agent may require that they are prepared by both a professional architect and professional engineers in the various areas of the relevant disciplines.
(d) Changes in Plans & Specifications: Two copies of amendments and/or changes to approved plans and specifications shall be submitted to the Development Agent for approval.

(e) Procedure for larger projects: The following additional information must be obtained and submitted for buildings with more than 8 dwelling units of 5,000 square feet in area.

1) Power Supply:
   i. Structures: Check for service locations and show in site plan.
   ii. Subdivisions: Check for availability of power and show source on site plan.

2) Water Supply:
   i. Structures: Check for service locations and provide information as to estimated water requirements.
   ii. Subdivisions: Check for availability of water and provided reproducible copy of Master Plan for Utility Company use.

3) Telephone Service:
   i. Structures: Check for service locations and provide reproducible copies of both the plot plan and electric plan for Telephone Company use.
   ii. Subdivision: Check for availability of telephone service and provide reproducible copy of Master Plan for Telephone Company use.

4) Internet Service: Check for availability of internet service and provide information as to requirements.

APPLICATION EXAMINATION:

(a) The Development Agent shall examine each application for permit along with the plans, specifications and computations filed therewith, and shall ascertain by such examination whether the construction indicated and described is in accordance with the requirements of this Code.

(b) The Development Agent will accept preliminary plans and specifications for examination, prior to application for permits, for the convenience of owners, designers, and contractors. A service charge of $5.00 per 100 s. f. of gross building floor space or equivalent shall be paid, based upon the scope of the project. However, such plans shall not be officially approved or disapproved. Such service charge may be credited against the Permit Fee.

(c) Applications shall be examined in the order received, except that rejected plans and specifications which have been corrected and resubmitted shall be examined first.

(d) All applications for single family dwelling houses of over 2,000 sq. ft. or for buildings consisting of more than 8 dwelling units of 5,000 sq. ft. in area shall
be reviewed by a Building Appearance Committee who may refuse acceptance of a building if, in their opinion, it is not appropriate for the location for which it is proposed. The Committee shall be comprised of 5 members namely, two professionally qualified architects and three other persons all appointed by the Port Authority or its designated Agent. A majority shall constitute a quorum.

APPLICATION ACTION:

(a) Approval: When the Development Agent is satisfied that the work described in the application for permit, and the plans and specifications filed therewith are in accordance with the requirements of this Code, a building permit shall be issued and the plans and specifications shall be marked “APPROVED”, and signed by the Development Agent.

(b) Disapproval: If the application or plans or specifications do not conform to the requirements of this Code, the Development Agent shall reject such applications in writing, stating the reasons for such action.

(c) Partial Approval: Pending the completion of checking plans and specifications, the Development Agent, at his discretion, and upon payment of the total required fee, may authorize the issuance of a temporary permit for site preparation, excavation, and below grade construction, but the holder of such temporary permit shall proceed at his own risk without assurance that a permit for the superstructure will be granted.

(d) Disposition of Approved Plans: One set of approved plans and specifications shall be returned to the permit holder and the other set shall be retained by the Development Agent for their permanent records.

CONDITIONS OF PERMIT

GENERAL:

(a) A permit issued shall not be construed as authority to violate, cancel, alter or set aside any provision of this Code. Neither the Development Agent nor any of his officers shall incur any liability of any kind in respect of any permit issued and compliance with the Code is the sole responsibility of the owner.

(b) A permit issued shall not be construed as authority to set aside or override any requirement or restriction which is binding upon the owner or occupier or any lot under the terms of the lease, conveyance, or title deed under which he owns or occupies such lot.

(c) The permit card shall be posted in a conspicuous place at the site of the work until the final completion and inspection. (See Building Permit Card in Appendix ‘F-D’.)
CODE COMPLIANCE:

(a) A permit issued shall not be construed as authority to violate, cancel, alter or set aside any of the provisions of this Code.

(b) Issuance of a permit shall not prevent the Development Agent from thereafter requiring a correction of errors in plans or construction, or of violations of this Code.

TIME LIMITATION:

(a) A permit issued shall become invalid if the work authorized by it is not commenced, or is suspended, for a period of 180 days.

(b) The Development Agent may extend the 180 day time limitation, provided a written application, showing good cause, is received before the expiration of the permit.

PERMIT REVOCATION: The Development Agent may revoke a permit or approval for the following reasons:

(a) False statements or misrepresentation of facts in the application or plans on which the permit or approval was based.

(b) Whenever the work for which a permit is issued is not being performed in accordance with plans, or specifications.

(c) Whenever a qualified inspector, required elsewhere in this Code, is not in attendance.

(d) Whenever the copy of approved plans are not available at the site.

(e) Whenever construction has started without filing proof of obtaining public liability and property damage insurance as required by this Code.

(f) Whenever the provisions of this Code are being violated, and not immediately corrected upon the order of the Development Agent.

(g) Whenever there is imminent danger that requires immediate action and is not corrected upon the order of the Development Agent.
INSURANCE:

(a) Prior to commencing work the permit holder shall file a certificate showing that public liability insurance is in force to indemnify him in respect of his legal liability following accidents caused by or in connection with the work, resulting in bodily injury (including death) to third parties, or damage to property belonging to third parties. Such policy of insurance shall provide a minimum indemnity limit of $500,000.00 in respect of any one accident and shall be written by an approved insurance company.

(b) The permit holder shall also file a certificate showing that his liabilities under the Workmen’s Compensation Acts of the Bahamas are covered by a policy of insurance.

(c) - delete

(d) - delete

302.1 All plans required under the Professional Architects Act, 1994 to be prepared by a licensed Architect or Architectural Technician shall be sealed and signed legibly by the said Architect or Architectural Technician who has been registered under the Professional Architects Act, 1994. Any citizen or permanent resident of the Bahamas submitting an application under the conditions of Section 30(4) of the Professional Architects Act shall be required to sign and legibly print his or her name on all drawings for which he or she is responsible. The plans shall include every floor, and section of every storey, floor, stairwell, and roof of the building, upon which sufficient details shall be included to show whether the building complies with this Code Two copies of all plans and documents accompanying an application shall be furnished to the Building Department. One copy shall be kept by the Director and one copy returned to the applicant, on the approval of the application. Such plans shall include:

(a) The level of the site of the building, the level of the lowest floor of the building and the level of any street adjoining the premises in relation to one another and above some known datum. In low-lying areas the level of the lowest floor should be at least 12” above any known flood level or 18” above crown on adjacent road whichever is the greater. Please refer to the FLOOD RISK map of Grand Bahama – The Port Area – Appendix F-A.

(d) The complete drawings and specifications as required by this Code of all the Plumbing within the building together with the details of any septic tank and disposal well or sewer treatment plant where a
sewer is not available. Soakaways and open sewer pits are not permitted.

302.2 A site (lot) plan shall be included, drawn to a scale of 20’ to the inch showing:

(a) The size and position of the building, and its relationship to property boundaries (all setbacks) and adjoining buildings and the legal description of adjacent lots.

(c) The name of the subdivision and the legal description of the lot.

(f) The areas of vegetation of the said land to remain undisturbed.

302.4 All site plans must be prepared by a licensed surveyor registered under the Land Surveyor Act 1975. Installation of boundary markers must be available for inspection during the time of the foundation inspection.

302.5 (b) where calculations are required under Sub-section (a)(i) they shall be prepared by a licensed professional Engineer.

303 PRESENTATION OF PLANS

303.3 The maximum size sheet for presentation of drawings shall be 36” x 48”. Projects requiring larger sheets shall make use of match lines. All others are to be 24” x 36” (Arch D), all sheets shall be similarly sized, collated in alpha-numeric order and properly fastened.

304 ALTERATIONS TO AND EXTENSIONS OF BUILDINGS

(c) All alterations or extensions to any existing building or building in the course of erection shall be subject to the requirements of The Grand Bahama Port Authority, Limited’s Code with regard to land usage and setbacks, it shall also be subject to the setback requirements rendered necessary by Group of Occupancy and Type of Construction into which it is classed, whichever is the more restrictive. In no case shall any part of any alteration.

308 EXEMPTIONS

For the purpose of this Code the following only are exempted from the need to obtain a building permit.

308.2 Notwithstanding the above, the applicant shall satisfy the requirements of The Grand Bahama Port Authority, Limited’s Planning Code and also those restrictions as set forth by the developers of the particular private subdivisions in the City of Freeport\Lucaya.
FEES PAYABLE FOR BUILDING PERMITS

GENERAL:

(a) The Development Agent shall inspect or cause to be inspected all buildings, structures, and site works from time to time during and upon completion of the work for which a permit was issued. A building permit fee shall be attached for mandatory periodic inspections. For Example, elevators, generators, environmental concerns etc.

DOUBLE FEE: When work for which a permit is required is started prior to the obtaining of a building permit, the fee as required may be doubled.

REFUNDS: Fifty percent (50%) of the permit fee shall be refunded, upon written request for voluntary revocation of the permit, provided the work has not commenced, nor previously become invalid.

REINSTATED PERMIT: Where a permit has been revoked for cause by the Development Agent, in accordance with the provisions of this Code, or otherwise become invalid, an application for reinstatement shall be accompanied by permit fees, as follows:

(i) If application is made within 30 days of the permit revocation new fee shall be 25% of scheduled rate.

(ii) If application is made after 30 days of the permit revocation it shall be considered a new application and accompanied by full scheduled fees.

310.1 A BUILDING PERMIT shall be valid for a maximum period of 6 months from the date of issuance of the permit.

310.2 BUILDING PERMIT RENEWAL shall be renewed for maximum of three (3) periods of 6 months from the original expiration date. A building permit that has expired for more than a six month period or a permit that has already been renewed for three periods shall not be renewable. A new application and cost of the entire permit fee will be required.

There shall be charged and payable for every building permit or renewal a fee according to the scale set out in the schedule of building permit fees as produced by the Director of Building & Development Services of The Grand Bahama Port Authority, Limited.
311 PRE-ENGINEERED BUILDINGS

Application for buildings making use of pre-engineered components shall be accompanied by calculations and drawings detailing the components, the method of assembly and method of obtaining continuity in design. These shall be prepared by a Professional Engineer recognized by the Minister. Where pre-engineered units are used for multi-floor design, care shall be taken to prevent failure due to progressive collapse arising from the failure of a component part.

Components shall be tested by a testing laboratory or organization approved by the Buildings Control Officer for both the structural strength and fire rating. The result of such tests shall accompany the application.

312 MANDATORY INSPECTIONS

312.1 (a) LAYOUT INSPECTION shall be required in private developments.

(b) FOUNDATION INSPECTION shall be made when the necessary excavations have been completed, forms erected and the reinforcing steel placed in position. Site (lot) marker shall be clearly identifiable and a licensed registered surveyor shall check and approve the location of the lot markers.

312.2 PILING INSPECTIONS shall be made during the driving of the piles and after all piles are driven and forms erected and reinforcing steel in place and before any concrete is poured. The builder shall be responsible for keeping a log of the pile driving and shall supply a copy to the Director of the Building & Development Services Department.

312.3 THE COLUMN INSPECTION shall be made when the wall blocks have been laid, the tie columns formed and the reinforcing steel in place but leaving one face open for inspection and before the concrete is poured.

312.4 STRUCTURAL COLUMN INSPECTION shall be made before any blocks are laid, the columns shall be formed up the reinforcing steel in place, and clearly visible but before the concrete is poured.

312.5 TIE BEAM INSPECTION shall be made when the block walls are completed tie beam level, the tie columns formed and poured, reinforcing steel in place and clearly visible but before the tie beam concrete is poured.
312.7 STRUCTURAL FRAMEWORK INSPECTION: Inspection is to be made at each floor level and after all framing, fire blocking, furring and bracing are in place, and plumbing, mechanical and electrical work are roughed in. If the structural is of steel or of other similar materials forming a frame, inspection shall take place on the complete frame for single floor buildings, for larger buildings it shall be by floors beam systems.

NOTE: For building of more than one floor of structural frame design, inspections 312.4, 312.6 and 312.7 shall be made in each floor level.

312.8 ROOF INSPECTION shall be made when the roof frame is in place, and before the upper surfaces are covered with roof material and before the ceiling is in place.

312.9 PLUMBING INSPECTIONS: All plumbing work shall be left uncovered and convenient for examination until inspected and approved. Floors shall be left up in all bathrooms and elsewhere above all sanitary plumbing, water-supply and gas supply piping and other plumbing work until it shall have been examined, tested and approved. The following Plumbing inspections shall be made on all buildings and at all floor levels, if the building has more than one floor:

(a) Roughing-in with pipe joints and fittings exposed
(b) Plumbing in walls and baths in place for hydrostatic tests
(c) Fixtures in place

312.11 ELECTRICAL INSPECTIONS: The following electrical inspections shall be made on all buildings and no conduit boxes, panels or other electrical appurtenances shall be covered or concealed until approval shall have been received. Should the building have more than one storey, inspections (b), (c) and (d) shall also be made at each storey.

(a) Service Location
(b) Conduit roughing-in
(c) Conductors installed and joints made
(d) Final

312.15 MECHANICAL INSPECTION: (a) All portions of the mechanical system must be inspected before any portion of the system is covered up.

312.16 No work shall be done on any part of a building or structure or any plumbing, electrical or mechanical installation beyond the point indicated herein above for each successive inspection until such inspection has been made and the work approved and the inspector has so indicated on the approved plans or inspection results card at the job site.

(a) No reinforcing steel or structural framework of any part of the
building or structure shall be covered or concealed in any manner whatsoever without the approval of the Development Agent.

(b) Rejection or refusal to approve the work, for reasons of incompleteness, code violation or inadequacy shall nullify that request for inspection and a repeat inspection shall be requested after the work has been made to comply.

SPECIAL INSPECTOR:

(a) General: The Development Agent may require the owner to employ a special inspector for the following projects.

(1) Major new buildings or additions

(2) Major structural alterations

(3) Concrete work where design is based upon a 28 day strength in excess of 2500 psi

(4) Buildings of unusual design or methods of construction

(5) Pile driving

(6) Specialized Buildings or portions of specialized buildings.

(b) Responsibility:

(1) The required special inspector shall be responsible to the Development Agent for compliance with this Code and for the control of the materials and methods of construction.

(2) The special inspector shall be present at all times that work for which his employment is mandatory, is in progress.

(c) Qualifications: Such special inspector shall be a qualified engineer and/or expert specialized in a relevant area of interest and acceptable to the Development Agent or his accredited employee. For large industrial projects such special inspectors along with the industrial owners shall indemnify GBPA against any liability.
(d) Reports:

(1) The special inspector shall submit to the Development Agent weekly reports showing the status and quality of the work.

(2) At the completion of the work the special inspector shall submit a certificate of compliance to the Development Agent stating that the work was done in compliance with this Code and in accordance with the plans and specifications.

317 APPROVED PRODUCTS

317.3 Should, subsequent to approval, it be determined by the Buildings Control Officer, that the product, material, equipment or assembly is no longer being supplied in compliance with the standards and / or conditions of approval, he may suspend, or revoke, the approval.

318 CERTIFICATE OF OCCUPANCY

GENERAL: No building shall be occupied without a valid and current Certificate of Occupancy. (See Appendix ‘F-E’ for facsimile)

CERTIFICATE ISSUED:

(a) New Buildings: If after the final inspection of buildings for which a permit has been issued, it is found that the building complies with the provisions of this Code, the Development Company shall issue a certificate of occupancy with the following information.

(1) The nature of the occupancy permitted.

(2) The number of persons permitted in each area, when limited.

(3) The allowable load per square foot, in accordance with the provisions of this Code, when determined to be crucial.

(b) Temporary Certificates: A temporary Certificate of Occupancy may be issued for the use of a portion or portions of a building which may be safely occupied prior to the final completion of the building.

(c) Existing Buildings: A Certificate of Occupancy may be issued to
existing buildings where such occupancy has been certified by the Development Agent to comply with the provisions of this Code, or the substantial intent of this Code.

REVOCATION OF CERTIFICATE:

(a) General: A Certificate of Occupancy may be revoked for the following reasons:

(1) Where an alteration or modification of the building does not comply with the provisions of this Code.

(2) Where an alteration or modification of a building does not comply with the requirements for the use or occupancy as approved.

(3) Where a change of use or occupancy is not suitable for the building as set forth in this Code.

(4) Where the use, occupancy, or construction does not comply with the requirements of the lease, conveyance restrictions, or deed.

(5) Any building found to be structurally unsafe, not in accordance with this Code, nor provided with an adequate egress, constituting a fire hazard or is otherwise dangerous to human life, or which in relation to existing use constitutes a hazard to safety or health by reason of inadequate maintenance, dilapidation, obsolescence, or abandonment.

(b) Notice to Owner: The Development Agent prior to revoking a certificate of occupancy shall notify the owner, or his agent, in writing, of his intension and allow such owner a definite period to comply with the provisions of this Code prior to revoking such certificate.

319 TESTS AND INSPECTIONS

RIGHT OF ENTRY: Upon the presentation of proper credentials the Development Agent or his representative may enter at reasonable times any building, structure or premises, within the jurisdiction of this Code, to perform any duty imposed upon him by this Code and denial of this right shall be cause for the revocation of a building permit or certificate of occupancy.
SPECIAL CERTIFICATION: The Development Agent shall make the inspections or test supervisions called for in this Code or he may require a certification from a competent special inspector or laboratory in lieu of inspections or tests under his own supervision.

320 TESTS

GENERAL:

(a) Whenever there is insufficient evidence that any material or construction conforms to the requirements of this Code, or there is insufficient evidence to substantiate claims for alternate materials or constructions, the Development Agent may require tests as proof of compliance to be made at the expense of the applicant by an approved agency.

(b) Tests shall be made in accordance with generally recognized standards for the material or construction in question, but in the absence of such standards the Development Agent shall specify the test procedure.

(c) The Development Agent may require tests to be repeated, if at any time there is reason to believe that a material or construction no longer conforms to the requirements on which its approval was based.

ALTERNATE METHODS OF CONSTRUCTION: The provisions of this Code are not intended to restrict types of construction, materials, or methods of design, not specifically mentioned. Upon approval of the Development Agent, new types of construction, material, or design, may be used if proved to be equal to or better than the general standards established by this Code.

321 TEMPORARY SERVICES

(a) TEMPORARY ELECTRICITY SERVICES:
A building permit issued for new construction, alteration, renovation or reconstruction shall qualify the project to procure temporary electrical power from the Utility provider for use in construction works and equipment testing. Temporary electrical power shall not be used for residing purposes.

(b) TEMPORARY WATER SERVICES:
A building permit issued for new construction, alteration, renovation or reconstruction shall qualify the project to procure temporary water services from the Utility provider for use in construction works and equipment testing. Temporary water service shall not be used for residing purposes.
CHAPTER 5

REQUIREMENTS OF GROUP A OCCUPANCIES

501 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

502.1 GENERAL:
(a) Buildings or parts of buildings classed in Group ‘A’ because of use and occupancy shall be limited in height and area as follows:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Allowable Height</th>
<th>Area per Floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Not limited</td>
<td>Not limited</td>
</tr>
<tr>
<td>II</td>
<td>60’ (four storeys)</td>
<td>15,000 sq. ft.</td>
</tr>
</tbody>
</table>

But deed restrictions to the individual lot/s of land shall govern whenever they are more restrictive

(b) delete

503 LOCATION ON PROPERTY

Buildings with Group A Occupancy shall comply with the requirements of Town Planning and the requirements herein stated, whichever are the more restrictive. Buildings with Group A Occupancy shall front directly upon a public street or on a (clear and permanently unobstructed) yard or court not less than 30 feet in width and connected to such public street.
CHAPTER 6

REQUIREMENTS OF GROUP B OCCUPANCIES

602 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

602.1 GENERAL:
(a) Buildings or parts of buildings classed in Group B because of use or occupancy shall be limited in height and area as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Allowable Height</th>
<th>Area Per Floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Not Limited</td>
<td>Not Limited</td>
</tr>
<tr>
<td>II</td>
<td>60 feet (4 storeys)</td>
<td>15,000</td>
</tr>
<tr>
<td>III Protected</td>
<td>30 feet (2 storeys)</td>
<td>13,500</td>
</tr>
<tr>
<td>III Unprotected</td>
<td>20 feet (1 storey)</td>
<td>9,000</td>
</tr>
</tbody>
</table>

But deed restrictions to the individual lot/s of land shall govern whenever they are more restrictive.

603 LOCATION ON PROPERTY

603.2 Buildings of Group B Occupancy shall front directly upon a public street or on a clear and permanently unobstructed yard or court not less than 30 feet in width and connected to such public street. Exterior walls shall have fire-resistance and opening protection, determined by location on property, as set forth for the Type of Construction in Part V.
CHAPTER 7

REQUIREMENTS OF GROUP C OCCUPANCIES

702 CONSTRUCTIONS, HEIGHT AND AREA ALLOWABLE

702.1 GENERAL:
(a) Buildings, or parts of buildings classed in Group C because of use or occupancy, shall be limited in height and area as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Allowable Height</th>
<th>Area Per Floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Not Limited</td>
<td>Not Limited</td>
</tr>
<tr>
<td>II</td>
<td>60 feet (4 storeys)</td>
<td>18,000</td>
</tr>
<tr>
<td>III</td>
<td>Protected 30 feet (2 storeys)</td>
<td>15,000</td>
</tr>
<tr>
<td>III</td>
<td>Unprotected &amp; IV 30 feet (1 storey)</td>
<td>13,500</td>
</tr>
<tr>
<td>V</td>
<td>30 feet (1 storey)</td>
<td>8,500</td>
</tr>
</tbody>
</table>

But deed restrictions to the individual lot/s of land shall govern whenever they are more restrictive.

703 LOCATION ON PROPERTY

703.1 Buildings with Group C Occupancy shall comply with the requirements of Town Planning and the requirements herein stated, whichever are the more restrictive. Buildings with Group C Occupancy shall front directly upon a public street or on a clear and permanent unobstructed yard or court not less than 30 feet in width and connected to such public street.
CHAPTER 8

REQUIREMENTS OF GROUP D OCCUPANCIES

802 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

802.1 GENERAL:
(a) Buildings, or parts of buildings classed in Group D because of use or occupancy shall be limited in height and area as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Allowable Height</th>
<th>Area Per Floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>50 feet (4 storeys)</td>
<td>11,250</td>
</tr>
<tr>
<td>II</td>
<td>30 feet (2 storeys)</td>
<td>9,300</td>
</tr>
<tr>
<td>III (protected)</td>
<td>20 feet (1 storey)</td>
<td>8,000</td>
</tr>
<tr>
<td>IV</td>
<td>20 feet (1 storey)</td>
<td>5,000</td>
</tr>
</tbody>
</table>

But deed restrictions to the individual lot/s of land shall govern whenever they are more restrictive

802.2 Attention is drawn to the Statute Law of the Commonwealth of The Bahamas with reference to the following Acts and Rules made under these Acts:

(a) No. 17 of 1968 - The Explosives Act
(b) Chapter 250 - The Inflammable Liquids Act
(c) Chapter 295 - The Cinematographic Act
(d) No. 14 of 1988 - The Liquefied Petroleum Gas Act
(e) The Current Environmental Laws

relating to any special conditions for the storage of hazardous materials.
CHAPTER 9

REQUIREMENTS OF GROUP E OCCUPANCIES

902 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

902.1 GENERAL:
(a) Buildings, or parts of buildings classed in Group E because of use or occupancy shall be limited in height and area as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Allowable Height</th>
<th>Area Per Floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Not Limited</td>
<td>Not Limited</td>
</tr>
<tr>
<td>II</td>
<td>60 feet (4 storeys)</td>
<td>20,000</td>
</tr>
<tr>
<td>111*</td>
<td>30 feet (2 storeys)</td>
<td>18,000</td>
</tr>
<tr>
<td>IV</td>
<td>(1 storey)</td>
<td>12,000</td>
</tr>
<tr>
<td>III** &amp; V</td>
<td>20 feet (1 storey)</td>
<td>10,000</td>
</tr>
</tbody>
</table>

*Protected
**Unprotected

But deed restrictions to the individual lot/s of land shall govern whenever they are more restrictive.

(b) Areas of Group E buildings may be increased in accordance with Sub-section 502.1(b).

(c) See Section 414.2 for increase in tabulated basic areas if an approved fire extinguishing system is installed throughout the building.

(d) See Section 3701.3 for construction requirements for Group E single storey buildings with specific distance separations.

902.2 Attention is drawn to the Statute Law of the Commonwealth of The Bahamas with reference to the following Acts and Rules made under these Acts:

(a) No. 17 of 1968 The Explosives Act

(b) Chapter 250 The Inflammable Liquids Act

(c) No. 14 of 1988 The Liquified Petroleum Gas Act

(d) The Current Environmental Laws

relating to any special conditions for the storage of hazardous materials.
1002 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

1002.1 GENERAL:

(a) Buildings or parts of buildings classed in Group F because of use or occupancy, shall be limited in height and area as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Allowable Height</th>
<th>Area Per Floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Not Limited</td>
<td>Not Limited</td>
</tr>
<tr>
<td>II</td>
<td>60 feet (4 storeys)</td>
<td>22,500</td>
</tr>
<tr>
<td>111*</td>
<td>30 feet (2 storeys)</td>
<td>20,000</td>
</tr>
<tr>
<td>III’ &amp; IV</td>
<td>20 feet (1 storey)</td>
<td>18,000</td>
</tr>
<tr>
<td>V</td>
<td>20 feet (1 storey)</td>
<td>12,000</td>
</tr>
</tbody>
</table>

* Protected
** Unprotected

But deed restrictions to the individual lot/s of land shall govern whenever they are more restrictive

(b) Areas of Group F buildings may be increased in accordance with sub-section 502.1(b).

(c) See Section 414.2 for increase in tabulated basic areas if an approved fire extinguishing system is installed throughout the building.

(d) See Section 3701.3 for construction requirements for Group F Division I and III Occupancy with specific distance separation requirements.

(e) Type V construction shall not be permitted for covered malls.
CHAPTER 11

REQUIREMENTS OF GROUP G OCCUPANCIES

1102 CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

1102.1 (a) Buildings, or parts of buildings classed in Group G because of use or occupancy, shall be limited in height and area as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Allowable Height</th>
<th>Area Per Floor (sf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Not Limited</td>
<td>Not Limited</td>
</tr>
<tr>
<td>II</td>
<td>60 feet (4 storeys)</td>
<td>15,000</td>
</tr>
<tr>
<td>III (Protected)</td>
<td>30 feet (2 storeys)</td>
<td>13,500</td>
</tr>
<tr>
<td>III (Unprotected)</td>
<td>20 feet (1 storey)</td>
<td>9,000</td>
</tr>
</tbody>
</table>

But deed restrictions to the individual lot/s of land shall govern whenever they are more restrictive

(b) Areas of Group G buildings may be increased in accordance with sub-section 502.1(b).

(c) See Section 414.2 for increase in tabulated basic areas if an approved fire extinguishing system is installed throughout the building.

1102.2 EXCEPTION: Type III (Protected) buildings maybe three storeys in height if the floor level of the third floor is not more than 20 feet above the grade adjacent thereto, but where this exception is used, load bearing walls shall be of non-combustible materials.

This allowance shall not be permitted if it conflicts with the individual lot/s of land deed restrictions.
CHAPTER 12

REQUIREMENTS OF GROUP H OCCUPANCIES

1202 CONSTRUCTION, HEIGHT AND ALEA ALLOWABLE

Buildings, or parts of buildings classed in Group H because of use or occupancy shall be limited in height and area as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Stories</th>
<th>Area Per Floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Not Limited</td>
<td>Not Limited</td>
</tr>
<tr>
<td>II</td>
<td>3</td>
<td>15000</td>
</tr>
<tr>
<td>III (Protected)</td>
<td>2</td>
<td>10,000</td>
</tr>
<tr>
<td>III (Unprotected), l’v &amp; V</td>
<td>1</td>
<td>7,500</td>
</tr>
</tbody>
</table>

But deed restrictions to the individual lot/s of land shall govern whenever they are more restrictive

EXCEPTION: Where intended as a single-family residence only, Type III (Unprotected) or Type V Construction may be used for buildings two stories high.
CHAPTER 13

REQUIREMENTS OF GROUP I OCCUPANCIES

1302  CONSTRUCTION, HEIGHT AND AREA ALLOWABLE

1302.3  DIVISION 3: Buildings classed in Division 3 of Group I shall comply to the following specific restrictions:

<table>
<thead>
<tr>
<th>Type</th>
<th>Allowable Height</th>
<th>Area Per Floor (sf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Unlimited</td>
<td>Unlimited</td>
</tr>
<tr>
<td>II</td>
<td>60 feet (4 storeys)</td>
<td>10,000</td>
</tr>
<tr>
<td>III (Protected)</td>
<td>30 feet (2 storeys)</td>
<td>5,000</td>
</tr>
<tr>
<td>III (Unprotected) &amp; IV</td>
<td>20 feet (1 storey)</td>
<td>3,000</td>
</tr>
<tr>
<td>V</td>
<td>10 feet (1 storey)</td>
<td>1,000</td>
</tr>
</tbody>
</table>

But deed restrictions to the individual lot/s of land shall govern whenever they are more restrictive.

1303  LOCATION ON PROPERTY

Buildings of Group I Occupancy shall comply with the requirements of Town Planning, the deed restriction for the individual lots and the requirements herein stated, whichever are the more restrictive.

Exterior walls of buildings of Group I Occupancy shall have fire resistance and opening protection, determined by location on property, as set forth for the Type of Construction in Part IV.
CHAPTER 20

DESIGN LOADS

2009 WIND LOADS

2009.1 General:

(a) Buildings and structures, and every portion thereof, shall be designed and constructed to meet the requirements of Section 6 of Standard 7-88 of the American Society of Civil Engineers (ASCE 7-88) entitled “Minimum Design Loads for Buildings and other Structures”; as more specifically defined in this Section based on a fifty-year mean recurrence interval or “the most widely adopted standards for the industry”.

(b) All buildings and structures within the Commonwealth of the Bahamas shall be considered to be at the hurricane coastline for purposes of application of the Importance Factor, I (Windload) contained within Table % of ASCE 7-88 or “the most widely adopted standards for the industry”.

(c) Buildings and structures in the coastal building zone, as that term is defined in Subsection 2002.1 above, shall be considered to be in Exposure Category D as defined in Section 6.5.3 of ASCE 7-88 or “the most widely adopted standards for the industry”.

(d) All buildings and structures not in the coastal building zone shall be considered to be in Exposure Category C as defined in Section 6.5.3 of ASCE 7-88 or “the most widely adopted standards for the industry”.

2010 LIVE LOADS POSTED

2010.2 Such plates shall be of approved durable materials displaying letters and figures not less than 1-1/2 " in height, and shall be securely affixed to the structure in conspicuous places.
CHAPTER 21
EXCAVATIONS, FOOTINGS AND FOUNDATIONS

2102 BEARING CAPACITY OF SOIL

2102.2 PRESUMPTIVE CAPACITIES:
(a) The allowable bearing capacities on supporting soils shall not exceed those set forth in the following table unless the design bearing capacity is substantiated by recognised tests, analysis and procedure. These values are considered safe in respect to actual failure of the supporting ground but do not necessarily ensure the prevention of excessive foundation movements where any unusual soil or moisture conditions are encountered. All muck, topsoil, organic material and debris shall be removed from the supporting subgrade.

(b) Variation in Underlying Soils:
(1) When Bearing materials directly under a foundation overlie a stratum having smaller allowable bearing values, these smaller values shall not be exceeded at the level of such stratum.

(2) Computations of the vertical pressure in the bearing materials at any depth below a foundation may be made on the assumption that the load is spread uniformly at an angle of 60° with the horizontal.

<table>
<thead>
<tr>
<th>Nature of Soil</th>
<th>Maximum Allowable Soil Pressure (Pounds/Square Foot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other than as stated below ..............................................................................</td>
<td>0</td>
</tr>
<tr>
<td>Rock of sand fill over soil of higher bearing capacity ..................................</td>
<td>500</td>
</tr>
<tr>
<td>Undisturbed sand, or sand and rock ...............................................................</td>
<td>2500</td>
</tr>
<tr>
<td>Solid rock or rock with pot holes cleaned and filled with concrete (Minimum depth of strata 6 feet), with no major cavities to a depth of 12 feet” ......................................................</td>
<td>5000</td>
</tr>
</tbody>
</table>

2103 SOIL BEARING FOUNDATIONS

2103.2 CONTINUOUS FOOTINGS:
(a) Footings under wall shall be continuous or continuity otherwise provided and shall not be less than required to keep the soil
pressure within that set forth in Section 2102 of this Chapter nor less than the following minimums:

<table>
<thead>
<tr>
<th>Allowable Bearing Capacity (Pounds per Square FOOT)</th>
<th>No. of Storeys</th>
<th>Depth and Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>1</td>
<td>12” x 30”</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>12” x 36”</td>
</tr>
<tr>
<td>2500</td>
<td>1</td>
<td>12” x 16”</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>12” x 20”</td>
</tr>
<tr>
<td>5000</td>
<td>1</td>
<td>*</td>
</tr>
</tbody>
</table>

*One storey or two-storey dwellings may be constructed directly on the surface only if solid rock exists at the surface, with a minimum depth of rock strata of 5 feet. Footings may be designed as reinforced concrete grade beams for the superimposed loads and may be the thickness of the wall they support, but never less than 8 inches and shall be keyed 6 inches into the rock; rock bearing pressures underneath shall not exceed the allowable bearing capacity of the rock. Must be certified by a Professional Engineer, whose registration under the Professional Engineers Act is current.

(b) (1) Based on soil investigation as set forth in Sub-section 2102.1, of this Chapter, the footing sizes may be reduced considering allowable bearing values and load, but the minimum width of a footing under the main walls of a building shall not be less than 16 inches nor less than eight inches more than the width of the foundation wall, except as indicated above for direct bearing on rock.

(2) The minimum depth of continuous footings shall not be less than 12 inches.

(3) Exception: Masonry wall/fences which are 2 ½ or more feet in height shall have reinforced concrete footings. Such footings may have a minimum depth of 8” and a minimum width of 16” provided the height of the wall/fence does not exceed 4 feet.

(c) The minimum continuous footings specified in this section shall be reinforced as follows:
Longitudinal Reinforcing
(Placed in bottom of footing with 3” concrete cover below reinforcing)

<table>
<thead>
<tr>
<th>Width of Foundation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2—#5 Bars</td>
</tr>
<tr>
<td>3—#5 Bars</td>
</tr>
<tr>
<td>4—#5 Bars</td>
</tr>
<tr>
<td>2—#5 Bars (minimum of one bar in bottom and one bar in top, with 3” concrete cover)</td>
</tr>
</tbody>
</table>

Excavations for continuous footings shall be cut true to line and grade and the sides of footings shall be formed, except where soil conditions are such that the sides of the excavation stand firm and square. Excavations shall be made to firm, clean bearing soil or rock.

2103.3 ISOLATED FOOTINGS

(c) Soil Testing: A test boring shall be required under every isolated footing which exerts a greater bearing pressure than 2500 PSF. Such probe shall be carried to a depth of at least 12 ft. below the bottom of the footing, to ensure that a minimum rock strata of at least 6 feet exists, and with no major solution cavities within the full 12-foot depth.

(d) (1) Design: When an isolated footing is eccentrically loaded the soil pressures may be assumed to be uniformly distributed over the area of the footing.

(2) Minimum Dimensions: Isolated footings shall have a minimum depth of 12” inches, and shall not be less than 20 inches square.

2104 PILE FOUNDATIONS

2104.1 GENERAL:

(o) The recognized Engineer and Special Inspector shall be required to keep an accurate record of the material and the principal dimensions of each pile; of the weight and fall of the hammer, if a
single-acting hammer or drop hammer; the size and make, operating pressure, length of hose, number of blows per minute and energy per blow, if a double-acting hammer; together with the average penetration of each pile for at least the last five blows, and the grades at tip and cut-off. A copy of these records shall be filed with the Buildings Control Division and kept with the approved plans.

(t) Piles shall not be driven closer than two feet nor jetted closer than ten feet to an existing building or structure unless approved by the recognized engineer or Special Inspector.

(u) Friction Piles: Friction piles shall be driven to a minimum penetration of 12 feet below the cut-off or the existing ground, whichever is the lower.

2104.2 ALLOWABLE PILE LOADS:

(a) GENERAL: The allowable axial and lateral loads on piles shall be determined by an approved driving formula, by load tests, or by a foundation investigation by a recognized engineer or Special Inspector. A foundation investigation shall be made if required by the BCO.

2104.4 PRECAST REINFORCED CONCRETE PILES:

(d) Piling shall be designed to resist stresses induced by handling and driving as well as loads. Concrete piles shall not be driven until they have attained their full specification strength as verified by tests, nor shall the piles be removed from the forms until 50% of the specification strength has been attained. Piles shall not be transported nor driven until they have been cured not less than seven (7) days for Type I cement and three (3) days for Type III cement. (ASTM Designation).

(e) Piling shall have their date of manufacture and the lifting points clearly marked on the pile. For point bearing piles, the concrete area of the tip shall be not less than 75% of the area of the butt.

2107 SEAWALLS, BULKHEADS, AND DOCKS

(a) These structures shall retain the adjoining earth from the surface of the ground to a point sufficiently deep to retain the base against surcharge pressures, with due design consideration for wave action and currents.
(b) Where “riprap” is placed below a structure and has side slopes not steeper than one and one-half to one (1 ½ : 1), does not extend above elevations minus 1.0 and has a width at the top at least three (3) feet greater than the width at the base of the structure above, it will be classified as retaining the adjoining earth.

2108 MATERIALS

The quality and design of materials used structurally in excavations, footings, foundations, retaining walls, seawalls, bulkheads and docks, shall conform to the requirements specified in the Chapters forming the Engineering and Construction Requirements of this Code. (Chapters 20-27).

(a) Timber shall not be used, other than where located below mean low water, except that borer-resistant or appropriately treated woods may be permitted.

(b) Structures may be constructed of a combination of lime rock bolders and concrete. The minimum percentage of cross-section area of the concrete to the total cross-section area of the structure shall be 40%, not including concrete used for copings or decorative purposes.
CHAPTER 23

STEEL AND IRON

2308 OPEN WEB STEEL JOISTS

2308.1 STANDARDS: Open web steel joists shall comply with the Standards set forth in Appendix A.

2308.4 BRIDGING:

(c) Bridging members shall be of material having a thickness not less than .0598 inches (or 16 US Standard Steel Plate Gage) inches thick for cold-formed sections.

2309.3 STRUCTURAL MEMBERS OTHER THAN DECKS: Design and fabrication shall be as set forth in Sub-section 2309.2, except as follows:

(a) All connections shall be by welding, riveting, bolting or other suitable approved fastening devices or methods providing positive fastening and resistance to loosening under wind and live loads. Welding of members shall be made on two sides or two edges of each bearing in such a manner as to resist effectively the stresses developed.
CHAPTER 24
WOOD

2406 CONSTRUCTION DETAILS

2405.4 PREFABRICATED ROOF TRUSSES

(4) TRUSS ERECTION:

(b) For trusses having an overall length of the bottom chord in excess of 40’-0” erection shall be supervised by an Engineer and/or a Special Inspector recognized by the Minister and retained by the contractor.

2406.6 SHEATHING

(2) ROOF SHEATHING:

(5) Nail spacing shall be 6” on centres in the field and 4” on centres at edges and seams at gable ends in all cases.

2410 MINISTRY OF WORKS LOW CONSTRUCTION HOUSING PLANS

“Delete”

2411 (a) PRE-FABRICATED ROOF TRUSSES

All on-site fabricated roof trusses must be designed and approved by a professional structural engineer.

(b) Shop drawings showing structural engineering data prepared by a licensed approved manufacturer or an approved manufacturer from outside acceptable to the director must be filed with the Building Department and accepted by the Director of Building & Development Services for pre-fabricated roof trusses.
CHAPTER 27

MASONRY

2701  DESIGN

2701.2  Buildings not exceeding three storeys or 40 feet in height shall be designed as either wall-bearing or skeleton frame or a combination thereof and all buildings more than three storeys or 40 feet in height shall be designed as a skeleton frame. Refer to Section 2706.2 of this Chapter for exterior wall requirements.

2706  CONSTRUCTION DETAILS:

2706.2  EXTERIOR WALLS / REINFORCED MASONRY

(b)  TIE COLUMNS:

(1)  Concrete tie columns shall be required in all exterior walls of unit masonry. Concrete tie columns shall be required at all corners, and at intervals not to exceed 20 feet centre-to-centre of columns, adjacent to any corner opening exceeding four feet in width, adjacent to any wall opening exceeding eight feet in width, and at the end of free-standing walls exceeding two feet in length. Where rough openings are between 3'-0" and 9'-0" in width, such openings shall have one #5 vertical reinforcing bar at each side. Vertical bars shall be into footings and tie beams. Structurally designed columns may be substituted for the tie columns herein required.

(c)  TIE BEAMS:

(6)  The concrete in tie beams shall be placed to bond to the masonry units immediately below and shall not be separated therefrom by wood, felt, or any other material which may prevent bond. Cavity caps no wider than the width of the cells of the block may be used provided that it is depressed a minimum of 2 inches in one cell of each block.

(i)  CHASES, RECESSES AND OPENINGS:

(3)  Where the Tie-Beam is deepened in excess of eight inches (8") with a span less than six feet (6'-0") in length, and the Tie-Beam itself is capable of supporting all loads, the
dropped portion shall contain (2) #4 horizontal bar in the bottom, bent up at each end and fastened to the upper tie steel beam or two (2) #4 horizontal bars.

(4) Where the span is in excess of eight feet (8’-0”) a special design beam is required.
CHAPTER 30

ROOF COVERING AND APPLICATION

3001 GENERAL

3001.4 (a) VENTING:
(3) (Not applicable in the City of Freeport/Lucaya)
(4) (Not applicable in the City of Freeport/Lucaya)

3001.6 MINIMUM ROOF COVERING
(b) APPLICATION

(6) Minimum Roof Covers applied in new construction shall drain in such manner to leave the roof surface void of water within immediately after rainfall.

3002.4 BUILT-UP ROOFING COMPONENTS AND ROOF SYSTEM ASSEMBLIES:

(a) (1) A Minimum Roof Covering base sheet, as defined in Subsection 3401.7(a)(2), if hot mopped to a concrete substrate, shall be mopped to a minimum of 20-25 lbs. per square yard of approved asphalt. The hot mopped asphalt membrane is to be applied to a dry primed surface. Additional plies over a base ply shall be applied in a quantity not less than 20 lbs. per square yard. Asphalt mopping shall provide a thin, even layer, with no voids or dry spots. Pour coats over a top ply shall be in a quantity not less than 50 lbs. per square. Application temperatures shall be within +/- 25°F of the equiviscous temperature (EVT) printed on the asphalt. Sheets shall be embedded without wrinkles or buckles.
CHAPTER 31

CLADDING AND GLAZING

3110 GYPSUM BOARD PRODUCTS AND ACCESSORIES

3110.4 STEEL STUDS, CEILING SUPPORTS, TRACK RUNNERS:
(a) Steel studs and runners used to construct fire-resistive walls or partitions shall be hot-dipped galvanized in accordance with ASTMA525, of channel or “C” type shape and not less than 0.019” (26 Gage) in thickness if unpainted and 0.020” (25 Gage) in thickness if painted after galvanizing. Structural properties of such studs and runners shall comply with ASTM C645.
CHAPTER 36

PLUMBING

3601 ADMINISTRATIVE

3601.5 BUILDING PERMITS & PLUMBING PERMITS:

(a) PERMITS REQUIRED: It shall be unlawful to commence work on any building or premises on which plumbing is required or is to be installed; perform any work covered by the Plumbing Code including, but not limited to, the excavation or obstruction of any public or private street, alley or other thoroughfare for the purpose of installing plumbing, sewer or drainage work or connect to any public or private water supply system and / or sewer or appurtenance thereof, commence the construction, reconstruction, alteration, repair and / or remodeling of any plumbing, sewer, septic tank, sewage or liquid waste treatment system, surface drainage, public swimming pools, supply or drainage wells, fire lines, water supply and waste connections from air handling and heating units and / or other drainage work without first having filed application and obtained a permit from the BCO, except that no permit will be necessary for the repair of leaks, unstopping of sewers or waste pipes, repairing faucets or valves or cleaning of a septic tank where such work is located within the property lines. The cost of permits shall be as set forth by the Building & Development Services Department, in accordance with current published rates. Effective January 1st, 2003 a plumbing permit shall also be obtained from the Buildings Control Officer before work commences on any building or premises on which plumbing works is required.

3602 DEFINITIONS

ACCEPTED ENGINEERING PRACTICE. That which conforms to accepted principles, tests or standards of nationally recognized technical or scientific authorities.

ACCESS (TO). That which enables a fixture, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel, door or similar obstruction (see "Ready access").

ACCESS COVER. A removable plate, usually secured by bolts or screws, to permit access to a pipe or pipe fitting for the purposes of inspection, repair or cleaning.

ADAPTER FITTING. An approved connecting device that suitably and properly joins or adjusts pipes and fittings which do not otherwise fit together.
AIR ADMITTANCE VALVE. One-way valve designed to allow air to enter the plumbing drainage system when negative pressures develop in the piping system. The device shall close by gravity and seal the vent terminal at zero differential pressure (no flow conditions) and under positive internal pressures. The purpose of an air admittance valve is to provide a method of allowing air to enter the plumbing drainage system without the use of a vent extended to open air and to prevent sewer gases from escaping into a building.

AIR BREAK (Drainage System). A piping arrangement in which a drain from a fixture, appliance or device discharges indirectly into another fixture, receptacle or interceptor at a point below the flood level rim and above the trap seal.

AIR GAP (Drainage System). The unobstructed vertical distance through the free atmosphere between the outlet of the waste pipe and the flood level rim of the receptacle into which the waste pipe is discharging.

AIR GAP (Water Distribution System). The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture or other device and the flood level rim of the receptacle.

ALTERNATIVE ENGINEERED DESIGN. A plumbing system that performs in accordance with the intent of Chapter 36 and provides an equivalent level of performance for the protection of public health, safety and welfare. The system design is not specifically regulated by Chapter 36.

ANCHORS. See "Supports."

ANTISIPHON. A term applied to valves or mechanical devices that eliminate siphonage.

APPROVED AGENCY. An established and recognized agency approved by the code official and that is regularly engaged in conducting tests or furnishing inspection services.

ASPIRATOR. A fitting or device supplied with water or other fluid under positive pressure that passes through an integral orifice or constriction, causing a vacuum. Aspirators are also referred to as suction apparatus, and are similar in operation to an ejector.

BALL COCK. See "Fill valve."

BASE FLOOD ELEVATION. A reference point, determined in accordance with the building code, based on depth or peak elevation of flooding, including wave height, which has a 1 percent (100 year flood) or greater chance of occurring in any given year.

BATHROOM GROUP. A group of fixtures consisting of a water closet, lavatory, bathtub or shower, including or excluding a bidet, an emergency floor drain or both. Such fixtures are located together on the same floor level.

BEDPAN STEAMER OR BOILER. A fixture utilized for scalding bedpans or urinals by direct application of steam or boiling water.

BEDPAN WASHER AND STERILIZER. A fixture designed to wash bedpans and to flush the contents into the sanitary drainage system. Included are fixtures of this type that provide for disinfecting utensils by scalding with steam or hot water.
**BEDPAN WASHER HOSE.** A device supplied with hot and cold water and located adjacent to a water closet or clinical sink to be utilized for cleansing bedpans.

**BUILDING TRAP.** A device, fitting or assembly of fittings installed in the building drain to prevent circulation of air between the drainage system of the building and the building sewer.

**CIRCUIT VENT.** A vent that connects to a horizontal drainage branch and vents two traps to a maximum of eight traps or trapped fixtures connected into a battery.

**CISTERN.** A small covered tank for storing water for a home or farm. Generally, this tank stores rainwater to be utilized for purposes other than in the potable water supply, and such tank is placed underground in most cases.

**CLEANOUT.** An access opening in the drainage system utilized for the removal of obstructions. Types of cleanouts include a removable plug or cap, and a removable fixture or fixture trap.

**CODE OFFICIAL.** The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative.

**COMBINATION FIXTURE.** A fixture combining one sink and laundry tray or a two- or three-compartment sink or laundry tray in one unit.

**COMBINATION WASTE AND VENT SYSTEM.** A specially designed system of waste piping embodying the horizontal wet venting of one or more sinks or floor drains by means of a common waste and vent pipe adequately sized to provide free movement of air above the flow line of the drain.

**CONCEALED FOULING SURFACE.** Any surface of a plumbing fixture which is not readily visible and is not scoured or cleansed with each fixture operation.

**CONSTRUCTION DOCUMENTS.** All of the written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of the project necessary for obtaining a building permit. The construction drawings shall be drawn to an appropriate scale.

**CONTAMINATION.** An impairment of the quality of the potable water that creates an actual hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids or waste.

**CRITICAL LEVEL (C-L).** An elevation (height) reference point that determines the minimum height at which a backflow preventer or vacuum breaker is installed above the flood level rim of the fixture or receptor served by the device. The critical level is the elevation level below which there is a potential for backflow to occur. If the critical level marking is not indicated on the device, the bottom of the device shall constitute the critical level.

**DEPTH OF WATER SEAL.** The depth of water that would have to be removed from a full trap before air could pass through the trap.

**DESIGN FLOOD ELEVATION.** Reserved

**DISCHARGE PIPE.** A pipe that conveys the discharges from plumbing fixtures or appliances.

**DRAINAGE FITTINGS.** Type of fitting or fittings utilized in the drainage system. Drainage fittings are similar to cast-iron...
fittings, except that instead of having a bell and spigot, drainage fittings are recessed and tapped to eliminate ridges on the inside of the installed pipe.

**DRAINAGE FIXTURE UNIT.** Drainage (dfu). A measure of the probable discharge into the drainage system by various types of plumbing fixtures. The drainage fixture-unit value for a particular fixture depends on its volume rate of drainage discharge, on the time duration of a single drainage operation and on the average time between successive operations.

**EMERGENCY FLOOR DRAIN.** A floor drain that does not receive the discharge of any drain or indirect waste pipe, and that protects against damage from accidental spills, fixture overflows and leakage.

**ESSENTIALLY NONTOXIC TRANSFER FLUIDS.** Fluids having a Gosselin rating of 1, including propylene glycol; mineral oil; polydimethylsiloxane; hydrochlorofluoro-carbon, chlorofluorocarbon and carbon refrigerants; and FDA-approved boiler water additives for steam boilers.

**ESSENTIALLY TOXIC TRANSFER FLUIDS.** Soil, waste or gray water and fluids having a Gosselin rating of 2 or more including ethylene glycol, hydrocarbon oils, ammonia refrigerants and hydrazine.

**EXISTING INSTALLATIONS.** Any plumbing system regulated by this code that was legally installed prior to the effective date of this code, or for which a permit to install has been issued.

**FAUCET.** A valve end of a water pipe through which water is drawn from or held within the pipe.

**FILL VALVE.** A water supply valve, opened or closed by means of a float or similar device, utilized to supply water to a tank. An antisiphon fill valve contains an antisiphon device in the form of an approved air gap or vacuum breaker that is an integral part of the fill valve unit and that is positioned on the discharge side of the water supply control valve.

**FIXTURE.** See "Plumbing fixture."

**FIXTURE FITTING**

- **Supply fitting.** A fitting that controls the volume and/or directional flow of water and is either attached to or accessible from a fixture, or is used with an open or atmospheric discharge.

- **Waste fitting.** A combination of components that conveys the sanitary waste from the outlet of a fixture to the connection to the sanitary drainage system.

**FIXTURE SUPPLY.** The water supply pipe connecting a fixture to a branch water supply pipe or directly to a main water supply pipe.

**FLOOD HAZARD AREA.** Reserved

**FLOW PRESSURE.** The pressure in the water supply pipe near the faucet or water outlet while the faucet or water outlet is wide open and flowing.

**FLUSH TANK.** A tank designed with a fill valve and flush valve to flush the contents of the bowl or usable portion of the fixture.

**FLUSHOMETER TANK.** A device integrated within an air accumulator vessel that is designed to discharge a predetermined quantity of water to fixtures for flushing purposes.
**HORIZONTAL PIPE.** Any pipe or fitting that makes an angle of less than 45 degrees (0.79 rad) with the horizontal.

**HOT WATER.** Water at a temperature greater than or equal to 110°F (43°C).

**HOUSE TRAP.** See "Building trap."

**INDIVIDUAL SEWAGE DISPOSAL SYSTEM.** A system for disposal of domestic sewage by means of a septic tank, cesspool or mechanical treatment, designed for utilization apart from a public sewer to serve a single establishment or building.

**INDIVIDUAL VENT.** A pipe installed to vent a fixture trap and connects with the vent system above the fixture served or terminates in the open air.

**INDIVIDUAL WATER SUPPLY.** A water supply that serves one or more families, and that is not an approved public water supply.

**JOINT**

**Expansion.** A loop, return bend or return offset that provides for the expansion and contraction in a piping system and is utilized in tall buildings or where there is a rapid change of temperature, as in power plants, steam rooms and similar occupancies.

**Flexible.** Any joint between two pipes that permits one pipe to be deflected or moved without movement or deflection of the other pipe

**Mechanical.** See "Mechanical joint."

**Slip.** A type of joint made by means of a washer or a special type of packing compound in which one pipe is slipped into the end of an adjacent pipe.

**LEAD-FREE PIPE AND FITTINGS.** Containing not more than 8.0-percent lead.

**LEAD-FREE SOLDER AND FLUX.** Containing not more than 0.2-percent lead.

**LOCAL VENT STACK.** A vertical pipe to which connections are made from the fixture side of traps and through which vapor or foul air is removed from the fixture or device utilized on bedpan washers.

**MACERATING TOILET SYSTEMS.** An assembly consisting of a water closet and sump with a macerating pump that is designed to collect, grind and pump wastes from the water closet and up to two other fixtures connected to the sump.

**MANIFOLD.** See "Plumbing appurtenance."

**MECHANICAL JOINT.** A connection between pipes, fittings, or pipes and fittings that is not screwed, caulked, threaded, soldered, solvent cemented, brazed or welded. A joint in which compression is applied along the centerline of the pieces being joined. In some applications, the joint is part of a coupling, fitting or adapter.

**MEDICAL GAS SYSTEM.** The complete system to convey medical gases for direct patient application from central supply systems (bulk tanks, manifolds and medical air compressors), with pressure and operating controls, alarm warning systems, related components and piping networks extending to station outlet valves at patient use points.

**MEDICAL VACUUM SYSTEMS.** A system consisting of central-vacuum-producing equipment with pressure and operating controls, shutoff valves, alarm-warning systems, gauges and a network of piping extending to and terminating with
suitable station inlets at locations where patient suction may be required.

**NONPOTABLE WATER.** Water not safe for drinking, personal or culinary utilization.

**NUISANCE.** Public nuisance as known in common law or in equity jurisprudence; whatever is dangerous to human life or detrimental to health; whatever structure or premises is not sufficiently ventilated, sewered, drained, cleaned or lighted, with respect to its intended occupancy; and whatever renders the air, or human food, drink or water supply unwholesome.

**OCCUPANCY.** The purpose for which a building or portion thereof is utilized or occupied.

**OFFSET.** A combination of approved bends that makes two changes in direction bringing one section of the pipe out of line but into a line parallel with the other section.

**OPEN AIR.** Outside the structure.

**PLUMBING APPLIANCE.** Any one of a special class of plumbing fixtures intended to perform a special function. Included are fixtures having the operation or control dependent on one or more energized components, such as motors, controls, heating elements, or pressure- or temperature-sensing elements.

Such fixtures are manually adjusted or controlled by the owner or operator, or are operated automatically through one or more of the following actions: a time cycle, a temperature range, a pressure range, a measured volume or weight.

**PLUMBING APPURTENANCE.** A manufactured device, prefabricated assembly or an on-the-job assembly of component parts that is an adjunct to the basic piping system and plumbing fixtures. An appurtenance demands no additional water supply and does not add any discharge load to a fixture or to the drainage system.

**POLLUTION.** An impairment of the quality of the potable water to a degree that does not create a hazard to the public health but that does adversely and unreasonably affect the aesthetic qualities of such potable water for domestic use.

**POTABLE WATER.** Water free from impurities present in amounts sufficient to cause disease or harmful physiological effects and conforming to the bacteriological and chemical quality requirements of the Public Health Service Drinking Water Standards or the regulations of the public health authority having jurisdiction.

**PUBLIC WATER MAIN.** A water supply pipe for public utilization controlled by public authority.

**QUICK-CLOSING VALVE.** A valve or faucet that closes automatically when released manually or that is controlled by a mechanical means for fast-action closing.

**READY ACCESS.** That which enables a fixture, appliance or equipment to be directly reached without requiring the removal or movement of any panel, door or similar obstruction and without the use of a portable ladder, step stool or similar device.

**RECLAIMED WATER.** Water that has received treatment and is reused after flowing out of a domestic wastewater treatment facility.

**REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER.** A backflow prevention device consisting of two independently acting check valves, internally force-loaded to a normally closed
position and separated by an intermediate chamber (or zone) in which there is an automatic relief means of venting to the atmosphere, internally loaded to a normally open position between two tightly closing shutoff valves and with a means for testing for tightness of the checks and opening of the relief means.

REGISTERED DESIGN PROFESSIONAL. An individual who is registered or licensed to practice professional architecture or engineering as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed.

RELIEF VALVE

Pressure relief valve. A pressure-actuated valve held closed by a spring or other means and designed to relieve pressure automatically at the pressure at which such valve is set.

Temperature and pressure relief (T&P) valve. A combination relief valve designed to function as both a temperature relief and a pressure relief valve.

Temperature relief valve. A temperature-actuated valve designed to discharge automatically at the temperature at which such valve is set.

SELF-CLOSING FAUCET. A faucet containing a valve that automatically closes upon deactivation of the opening means.

SEWAGE EJECTORS. A device for lifting sewage by entraining the sewage in a high-velocity jet of steam, air or water.

SPILLPROOF VACUUM BREAKER. An assembly consisting of one check valve force-loaded closed and an air-inlet vent valve force-loaded open to atmosphere, positioned downstream of the check valve, and located between and including two tightly closing shutoff valves and a test cock.

STACK VENTING. A method of venting a fixture or fixtures through the soil or waste stack.

STERILIZER

Boiling type. A boiling-type sterilizer is a fixture of a nonpressure type utilized for boiling instruments, utensils or other equipment for disinfection. These devices are portable or are connected to the plumbing system.

Instrument. A device for the sterilization of various instruments.

Pressure (autoclave). A pressure vessel fixture designed to utilize steam under pressure for sterilizing.

Pressure instrument washer sterilizer. A pressure instrument washer sterilizer is a pressure vessel fixture designed to both wash and sterilize instruments during the operating cycle of the fixture.

Utensil. A device for the sterilization of utensils as utilized in health care services.

Water. A water sterilizer is a device for sterilizing water and storing sterile water.

STERILIZER VENT. A separate pipe or stack, indirectly connected to the building drainage system at the lower terminal, that receives the vapors from nonpressure sterilizers, or the exhaust vapors from pressure sterilizers, and conducts the vapors directly to the open air. Also called vapor, steam, atmospheric or exhaust vent.
STRUCTURE. That which is built or constructed or a portion thereof.

SUBSOIL DRAIN. A drain that collects subsurface water or seepage water and conveys such water to a place of disposal.

SUMP. A tank or pit that receives sewage or liquid waste, located below the normal grade of the gravity system and that must be emptied by mechanical means.

SUMP VENT. A vent from pneumatic sewage ejectors, or similar equipment, that terminates separately to the open air.

SWIMMING POOL. Any structure, basin, chamber or tank containing an artificial body of water for swimming, diving or recreational bathing having a depth of 2 feet (610 mm) or more at any point.

TEMPERED WATER. Water having a temperature range between 85°F (29°C) and 110°F (43°C).

THIRD-PARTY CERTIFICATION AGENCY. An approved agency operating a product or material certification system that incorporates initial product testing, assessment and surveillance of a manufacturer's quality control system.

THIRD-PARTY CERTIFIED. Certification obtained by the manufacturer indicating that the function and performance characteristics of a product or material have been determined by testing and ongoing surveillance by an approved third-party certification agency. Assertion of certification is in the form of identification in accordance with the requirements of the third-party certification agency.

THIRD-PARTY TESTED. Procedure by which an approved testing laboratory provides documentation that a product, material or system conforms to specified requirements.

VACUUM. Any pressure less than that exerted by the atmosphere.

VACUUM BREAKER. A type of backflow preventer installed on openings subject to normal atmospheric pressure that prevents backflow by admitting atmospheric pressure through ports to the discharge side of the device.

VENT PIPE. See "Vent system."

WALL-HUNG WATER CLOSET. A wall-mounted water closet installed in such a way that the fixture does not touch the floor.

WATER-HAMMER ARRESTOR. A device utilized to absorb the pressure surge (water hammer) that occurs when water flow is suddenly stopped in a water supply system.

WATER HEATER. Any heating appliance or equipment that heats potable water and supplies such water to the potable hot water distribution system.

WELL

Bored. A well constructed by boring a hole in the ground with an auger and installing a casing.

Driven. A well constructed by driving a pipe in the ground. The drive pipe is usually fitted with a well point and screen.

WHIRLPOOL BATHTUB. A plumbing appliance consisting of a bathtub fixture that is equipped and fitted with a circulating piping system designed to accept, circulate and discharge bathtub water upon each use.
**Dug.** A well constructed by excavating a large-diameter shaft and installing a casing.

**Drilled.** A well constructed by making a hole in the ground with a drilling machine of any type and installing casing and screen.

### 3605 DRAINAGE SYSTEM AND DISPOSAL:

#### 3605.6 FIXTURE UNITS: VALUES FOR FIXTURES:

Fixture unit values as given in Table G designate the relative load weight of different kinds of fixtures which shall be employed in estimating the total load carried by a soil or waste pipe and shall be used in connection with the tables of sizes for soil, waste, and drain pipes for which the permissible load is given in terms of fixture units.

<table>
<thead>
<tr>
<th>Fixture Type</th>
<th>Fixture Unit Value as of Trap Load Factors</th>
<th>Minimum Size of Trap Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathtub (with or without overhead shower)</td>
<td>2</td>
<td>1-1/2 *</td>
</tr>
<tr>
<td>Bidet</td>
<td>2</td>
<td>1-1/2 *</td>
</tr>
<tr>
<td>Dental unit or cuspidor</td>
<td>1</td>
<td>1-1/4 *</td>
</tr>
<tr>
<td>Dental lavatory</td>
<td>1</td>
<td>1-1/4</td>
</tr>
<tr>
<td>Drinking fountain</td>
<td>1/2</td>
<td>1-1/4</td>
</tr>
<tr>
<td>Dishwasher domestic</td>
<td>2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Floor drains</td>
<td>3</td>
<td>3 or 4</td>
</tr>
<tr>
<td><strong>Floor Sinks</strong></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Lavatory (Small P.O.)</td>
<td>1</td>
<td>1-1/4</td>
</tr>
<tr>
<td>Lavatory (Large P.O.)</td>
<td>2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Lavatory, barber, beauty parlor</td>
<td>2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Lavatory, surgeon’s</td>
<td>2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Laundry tray (1 or 2 compartments)</td>
<td>2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Shower stall domestic</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Showers (group) per head</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>SINKS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combination sink-and-tray</td>
<td>3 (Nominal)</td>
<td>2</td>
</tr>
<tr>
<td>Combination sink-and-tray with food disposal unit</td>
<td>3</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Kitchen sink, domestic</td>
<td>2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Kitchen sink, domestic with food waste grinder</td>
<td>3</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Surgeon’s sink</td>
<td>3</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Flushing rim sink (with valve)</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Service sinks, combination trap standard</td>
<td>3</td>
<td>3 or 4</td>
</tr>
<tr>
<td>Service sink (PTrap) ordinary</td>
<td>2</td>
<td>1-1/2 or 2</td>
</tr>
<tr>
<td>Pot, scullery, etc., sink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>wash sink (circular or multiple)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixture Type</td>
<td>Minimum</td>
<td>Diameter</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>--------------</td>
<td>----------</td>
</tr>
<tr>
<td>each set of faucets</td>
<td>2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Urinal, pedestal</td>
<td>8 (nominal)</td>
<td>3</td>
</tr>
<tr>
<td>Urinal, wall</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Urinal stall, washout</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Water closet, tank operated</td>
<td>4 (Nominal)</td>
<td>3</td>
</tr>
<tr>
<td>Water closet, valve-operated</td>
<td>8 (Nominal)</td>
<td>3</td>
</tr>
<tr>
<td>Automatic-dish washer (domestic)</td>
<td>2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>Automatic clothes washer</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

*Minimum of 2” if below ground slab*

3605.7 DETERMINATION OF SIZES FOR THE GRAVITY DRAINAGE SYSTEM:

**Maximum Number of Fixture Units That May Be Connected to any Portion of the Building Drain or the Building Sewer**

<table>
<thead>
<tr>
<th>Diameter of Pipe Inches</th>
<th>1/16 Inch</th>
<th>1/8 Inch</th>
<th>1/4 Inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/4</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1-1/2</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>2-1/2</td>
<td>12</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>22</td>
<td>28</td>
<td>36</td>
</tr>
<tr>
<td>4</td>
<td>60</td>
<td>180</td>
<td>216</td>
</tr>
<tr>
<td>5</td>
<td>150</td>
<td>390</td>
<td>480</td>
</tr>
<tr>
<td>6</td>
<td>360</td>
<td>700</td>
<td>840</td>
</tr>
<tr>
<td>8</td>
<td>1,400</td>
<td>1,600</td>
<td>1,920</td>
</tr>
<tr>
<td>10</td>
<td>2,500</td>
<td>2,900</td>
<td>3,500</td>
</tr>
<tr>
<td>12</td>
<td>3,900</td>
<td>4,600</td>
<td>5,600</td>
</tr>
<tr>
<td>15</td>
<td>7,000</td>
<td>8,300</td>
<td>10,000</td>
</tr>
</tbody>
</table>

3610 VENTS AND VENTING SYSTEM

3610.2 **Connection.** All individual, branch and circuit vents shall connect to a vent stack, stack vent, air admittance valve or extend to the open air.

**Exception:** Vents for interceptors located outdoors.
3610.9 MAIN VENTS TO CONNECT AT BASE:

(e) ISLAND VENT:

(1) Island venting will be permitted only when no other venting system is possible.

(2) The branch of an island vent shall not exceed 15'-0" from a vented line.

(3) The minimum size of an island vent branch section and the vertical section up to and including the sanitary tees, and clean-outs shall be 3 inches, the vertical section and loop above the clean-outs, and tees, shall be a minimum of 2 inches. The fixture branch arms shall be a minimum of 1-1/2 inches.

(4) The fixture branch arms shall be installed on the upstream, vertical stack, above the clean-out so the base of both stacks and horizontal branch will be washed.

(5) The loop shall be vertical throughout.

(6) For fixtures not discharging greasy waste, island vent may be 2".

(f) AIR ADMITTANCE VALVES:

(1) General. Vent systems utilizing air admittance valves shall comply with this section. Stack-type air admittance valves shall conform to ASSE 1050. Individual and branch-type air admittance valves shall conform to ASSE 1051.

(2) Installation. The valves shall be installed in accordance with the requirements of this section and the manufacturer's installation instructions. Air admittance valves shall be installed after the DWV testing required by 3601.6 (e).

(3) Where permitted. Individual, branch and circuit vents shall be permitted to terminate with a connection to an individual or branch-type air admittance valve. Stack vents and vent stacks shall be permitted to terminate to stack-type air admittance valves. Individual and branch-type air admittance valves shall vent only fixtures that are on the same floor level and connect to a horizontal branch drain. The horizontal branch drain having individual and branch-type air admittance valves shall conform to Section 3610.5.
Stack-type air admittance valves shall conform to Section 3610.5.

(a) **Location of branch.** The horizontal branch drain shall connect to the drainage stack or building drain a maximum of four branch intervals from the top of the stack.

(b) **Relief vent.** Where the horizontal branch is located more than four branch intervals from the top of the stack, the horizontal branch shall be provided with a relief vent that shall connect to a vent stack or stack vent, or extend outdoors to the open air. The relief vent shall connect to the horizontal branch drain between the stack and the most downstream fixture drain connected to the horizontal branch drain. The relief vent shall be sized in accordance with Section 3610.5 (a) & (b) BBC and installed in accordance with Section 3610.2 BBC. The relief vent shall be permitted to serve as the vent for other fixtures.

### 3614 WATER SUPPLY AND DISTRIBUTION

3614.17 **HOT WATER DISTRIBUTION** : the sizing of the hot-water distribution piping shall conform to good engineering practice.

1. The provisions of this chapter shall govern the materials, design and installation of water heaters and the related safety devices and appurtenances.

2. **Water heater as space heater.** Where a combination potable water heating and space heating system requires water for space heating at temperatures higher than 140°F (60°C), a master thermostatic mixing valve complying with ASSE 1017 shall be provided to limit the water supplied to the potable hot water distribution system to a temperature of 140°F (60°C) or less. The potability of the water shall be maintained throughout the system.

3. **Drain valves.** Drain valves for emptying shall be installed at the bottom of each tank-type water heater and hot water storage tank. Drain valves shall conform to ASSE 1005.
(4) **Location.** Water heaters and storage tanks shall be located and connected so as to provide access for observation, maintenance, servicing and replacement.

(5) **Pressure marking of storage tanks.** Storage tanks and water heaters installed for domestic hot water shall have the maximum allowable working pressure clearly and indelibly stamped in the metal or marked on a plate welded thereto or otherwise permanently attached. Such markings shall be in an accessible position outside of the tank so as to make inspection or reinspection readily possible.

(6) **Temperature controls.** All hot water supply systems shall be equipped with automatic temperature controls capable of adjustments from the lowest to the highest acceptable temperature settings for the intended temperature operating range.

(7) **INSTALLATION**

(a) **General.** Water heaters shall be installed in accordance with the manufacturer's installation instructions. Oil-fired water heaters shall conform to the requirements of this code and the Florida Building Code, Mechanical. Electric water heaters shall conform to the requirements of this code and provisions of the Chapter 27 of the Florida Building Code, Building. Gas-fired water heaters shall conform to the requirements of the Florida Building Code, Fuel Gas.

(b) **Rooms used as a plenum.** Water heaters using solid, liquid or gas fuel shall not be installed in a room containing air-handling machinery when such room is used as a plenum.

(c) **Water heaters installed in garages.** Water heaters shall be installed in accordance with the manufacturer's installation instructions, which shall be available on the job site at the time of inspection.

(d) **Water heaters installed in attics.** Attics containing a water heater shall be provided with an opening and unobstructed passageway large enough to allow removal of the water heater. The passageway shall not be less than 30
inches (762 mm) high and 22 inches (559 mm) wide and not more than 20 feet (6096 mm) in length when measured along the centerline of the passageway from the opening to the water heater. The passageway shall have continuous solid flooring not less than 24 inches (610 mm) wide. A level service space at least 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the water heater. The clear access opening dimensions shall be a minimum of 20 inches by 30 inches (508 mm by 762 mm) where such dimensions are large enough to allow removal of the water heater.

(8) Safety Devices

(a) Pan size and drain. The pan shall be not less than 1.5 inches (38 mm) deep and shall be of sufficient size and shape to receive all dripping or condensate from the tank or water heater. The pan shall be drained by an indirect waste pipe having a minimum diameter of 0.75 inch (19 mm). Piping for safety pan drains shall be of those materials listed in Table 605.4.

(b) Pan drain termination. The pan drain shall extend full-size and terminate over a suitably located indirect waste receptor or floor drain or extend to the exterior of the building and terminate not less than 6 inches (152 mm) and not more than 24 inches (610 mm) above the adjacent ground surface.

3615 SEWAGE AND LIQUID WASTE DISPOSAL SYSTEMS

3615.5 LOCATION, DESIGN, CONSTRUCTION AND SPECIFICATIONS:

(a) (1) A minimum distance of 10 ft. (for tanks up to 2,100 U.S. gallons) shall be allowed from the boundary of the property and 5 feet from the proposed building. Tanks over 2,100 U.S. gallons shall be sited as approved by the Director of Building and Development Services.

3617 PLUMBING CODE FOR SMALL BUILDINGS

3617.12 RAINWATER • DISPOSAL:

(k) SOAKAWAYS: (Not applicable to the City of Freeport/Lucaya)
CHAPTER 37

3705  STANDPIPES

3705.5  MATERIALS: Architects or Engineers may submit suitable piping material to the Director of Building and Development Services for review and approval.

3705.7  OUTLETS: All standpipe hose stations shall be equipped with 2 1/2” inch valves adapted for 2 1/2” inch NST Fire Department hose connection in each outlet, including the basement and with the centreline of the 2 1/2 inch valve located not less than 4 feet nor more than 6 feet above the floor. Easily removable 2 1/2 inch by 1 1/2-inch adaptors may be placed in the valve outlets. All standpipes in buildings 4 or more stories in height shall extend above the roof a minimum of 28 inches and be equipped with 2 1/2 inch gate valve and a 2-way 2 1/2 inch outlet adapted for Fire Department 2 1/2 inch NST hose connection. See Sub-section 3705.2.

3713  AUXILIARY STAND BY EMERGENCY SERVICE

3713.1  (a)  (i)  Generator Sets: Generator sets shall be housed in a separate masonry enclosure of two hour fire resistant construction, with a self closing door of fire resistance construction. Such room or compartment shall not be located beneath any large assembly room or corridor that leads there from unless ceiled over by a concrete slab of not less than four inches in thickness or is placed inside an enclosure that is FM or UL certified.
CHAPTER 38

HEAT-PRODUCING APPARATUS

3810  SOLAR HEATERS:

(1) It is recommended that provision be made during the construction of new buildings for the installation, or eventual installation, of solar heating “in accordance with the current Bahamas Electricity Act.”
CHAPTER 39

SPECIAL HAZARDS

3902 FLAMMABLE AND COMBUSTIBLE LIQUIDS

3902.4 DETAILED REGULATIONS:

(p) Underground tanks installed in soil known to be unusually corrosive due to the conditions hereinafter set forth shall be protected from corrosion based on evaluation and designed by a professional engineer whose registration under the Professional Engineers Act must be current.

3903 VENTILATION & EXHAUST DUCTS

3903.2 GENERAL:

(e) All ventilating ducts shall be extended, continuously, to the exterior of the building, or to an acceptable location approved by the BCO.
CHAPTER 40

MECHANICAL VENTILATION

4005 HOODS OVER RESTAURANT EQUIPMENT

4005.1 (a) (1) EXCEPTIONS: Hoods shall not be required in kitchens used solely for the preparation of food for one family where mechanical or natural ventilation is otherwise provided.
CHAPTER 41

AIR CONDITIONING AND REFRIGERATION

4101 GENERAL

4101.2 (c) (2) When any of the following parameters are exceeded, plans and specification for heating, ventilation and air conditioning and refrigeration work shall be prepared by and each sheet bear the impress seal and signature of a professional engineer whose registration under the Professional Engineers Act 2004 must be current or a mechanical technician whose years of experience and involvement, in the opinion of the Director of Building and Development Services Department of the Grand Bahama Port Authority, Limited, is deemed sufficient.

(d) Plans and specification for heating, ventilation and air conditioning and refrigeration work for any new building or addition that includes a medical gas, steam, vacuum, toxic air filtration, fire alarm, or security alarm system shall be prepared by, and each sheet bear the impress seal and signature of a professional engineer whose registration under the Professional Engineers Act 2004 must be current or a mechanical technician whose years of experience and involvement, in the opinion of The Director of Building and Development Services of the Grand Bahama Port Authority, Limited is deemed sufficient.

4102 STANDARDS

4102.2 (a) MAINTENANCE RESPONSIBILITY: Beyond the scope of this installation standard lies the responsibility for the maintenance of equipment including air filters, motors, fire dampers and controls, and cleanliness of ducts and plenums. There shall be developed a greater awareness by owners, of the potential hazards of duct systems which do not receive periodic attention by qualified maintenance personnel with proven qualifications.
CHAPTER 43

ELEVATORS AND ESCALATORS

4303  GENERAL

4303.5  (E)  CERTIFICATES OF INSPECTION

(1) ISSUING OF CERTIFICATES: The B.C.O. shall file a full report of each and every inspection made, showing the exact condition of the equipment, with a statement of any repairs or replacements required. If this report indicates that the equipment meets the requirements of this Code and is in a safe operating condition, the B.C.O. will issue a certificate of operation for a load capacity not to exceed that named in the report of inspection. This certificate shall be valid for six months after the date of inspection for freight elevators, passenger elevators, escalators, building hoists and manlifts, and twelve months after date of as to dumbwaiters of either electric or hand powered type, freight elevators of the hand power type or other lifting apparatus, unless subsequent inspections indicate an unsafe condition.

No passenger elevator, freight elevator, dumbwaiter, escalator, hoist or other lifting apparatus may be operated without this certificate first having been conspicuously posted.

A new certificate shall be issued or an endorsement made on the existing certificate by the B.C.O. following each inspection period.

These inspections may be performed by the licensed elevator contractor in the presence of the director or his representative. However, the director may use his discretion to appoint an independent inspector, at the expense of the owner, if and when the situation warrants it.
CHAPTER 44

ELECTRICAL AND TELEPHONE SERVICES

4401 ELECTRICAL

4401.1 GENERAL: The requirements contained herein supplement but do not supercede the following:

The Buildings Regulation Act

The Electricity Act

The Out Island Electricity Act

and any Rules or Regulations made there under. In addition to the foregoing the Canadian Electrical Code Part I has been adopted for use in the Bahama Islands.

4401.2 GROUNDING: A rod electrode of rigid conduit not less than 3/4” internal diameter or copper clad solid rod not less than 5/8” diameter shall be driven to a sufficient depth to obtain a resistance of not more than 10 ohms.

4401.3 EQUIPMENT AND METER ROOMS:

(b) Electrical Equipment or Meter Rooms shall be provided with adequate ventilation, in accordance with manufacturer’s specification or the discretion of The Director of The Building & Development Services, The Grand Bahama Port Authority.

(c) All buildings of multiple occupancies (3 or more dwelling units) shall be as follows:

(i) There shall be an electric meter room of the size not less than as set forth below or less than required to enclose the proposed equipment:

- 3 to 12 meters 3’x 5’x 7’ high inside dimensions.
- 13 to 24 meters 5’ x 7’ x 7’ high inside dimensions.
- 25 meters and over size as necessary but not less than 5’ x 7’ x 7’ high.
(ii) The meter room shall be locked and inaccessible to occupants of the building.

(iii) The meter room shall house the main disconnecting means, sub-feed and sub-service disconnects, meter or meters, time clocks and panels for house or exit lights. No other equipment except a telephone or television terminal board, which must be in a separate area from the electrical equipment, shall be allowed in this room.

(iv) Pumps, water heaters, generators, washing machines and similar equipment shall not be installed in meter rooms.

(v) There shall be no storage in this room and a durable waterproof sign with lettering 2” in size minimum, shall be mounted on the outside of the door reading “ELECTRICAL METER ROOM** NO STORAGE PERMITTED.”

(vi) The meter room shall be separated from the remaining parts of the building by a fire separation of solid masonry or concrete construction with a fire-resistance rating of not less than 3 hours. This rating may be reduced to 2 hours, however, if the room is provided with an automatic fire extinguishing system.

4401.4 PORTABLE WIRING:

(b) only approved devices and methods are used.

4401.5 PLANS AND SPECIFICATIONS:

(a) Plans and specifications shall be submitted to the Buildings Control Officer for approval prior to the issuance of a building permit. Plans shall be mechanically reproduced prints on substantial paper or cloth, drawn to stalk except that an isometric or riser diagram need not be scaled. Designated electrical equipment rooms shall be drawn at a minimum of 1/4” = 1’-0” scale. All drawings must be presented in legible form.

When any of the following parameters are not exceeded, plans and specifications for electrical work may be prepared by any licensed electrician.

(i) The system requirements do not exceed a total connected electrical load of more than 800 amperes.
However, the BCO shall reserve the right to request the services of an professional engineer recognized by the Minister or an Electrical Contractor recognized by the Director of Building & Development Services Department, The Grand Bahama Port Authority, Ltd. in that discipline where he deems necessary for any particular application.

Where the services of a registered/licensed professional are required then that pertinent parts of the works shall be supervised by that professional.

“Electrical Contractor” shall mean a person as defined in the “Electricity Act”.

4401.6 EMERGENCY/ BACKUP POWER SUPPLY

(i) Where a generator is used to provide Electricity to occupancies other than residential occupancy, in the event of normal power failure, the generator set and its equipment shall be an Emergency Power Supply System.

(ii) Where a generator is used to provide Electricity to multiple residential occupancies, in the event of normal power failure, the generator set and its equipment shall be an Emergency Power Supply System.

(iii) Where portable generators are used to supply power to any building in the event of normal power failure, a manual transfer switch shall be required along with appropriate equipment.

4401.7 AMENDMENTS TO CANADIAN ELECTRICAL CODE


Rule 6-302 Overhead Consumer’s Service conductor delete sub-rule (1), (b) through (i).

Rule 6-302 Overhead Consumer’s Service conductor reword sub-rule (4) as follows: Consumer’s service conductors shall be not less than No. 3 AWG copper wire, or not less than No. 1 AWG aluminum wire.

12-202 -12-224 Open Wiring Rules- Delete entirely.
12-500 -12-526   Delete and reword as follows:

(ii) Non-metallic sheathed cable shall be permitted in or on temporary buildings.

12-702-12-716

(1) Delete- “and aluminum sheathed cable”

and add the following to:

(1) Aluminum sheathed cable of the (BY) type shall not be used due to climatic conditions. Other types may be used when approved in writing by The Director of Building & Development Services, the Grand Bahama Port Authority, Limited.

4402   TELEPHONE SERVICE

Delete. Refer to the Canadian Electrical Code Part 1 current edition for requirements.

4403   TELEPHONE SWITCHBOARD INSTALLATIONS

Delete. Refer to the Canadian Electrical Code Part 1 current edition for requirements.
### Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AASHTO</td>
<td>American Association of State Highway and Transportation Officials</td>
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<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
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<tr>
<td>ASA</td>
<td>American Standards Association</td>
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<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
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<tr>
<td>AWWA</td>
<td>American Water Works Association</td>
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<td>B&amp;DS</td>
<td>Building and Development Services</td>
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<td>Code</td>
<td>The Grand Bahama Port Authority and Sanitary Code, Planning and Development Volume</td>
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<td>Msl</td>
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<tr>
<td>NSF</td>
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<tr>
<td>Ppm</td>
<td>parts per million</td>
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<tr>
<td>Psig</td>
<td>pounds per square inch gauge</td>
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<tr>
<td>Psi</td>
<td>pounds per square inch</td>
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<td>ROW</td>
<td>right-of-way</td>
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<td>SN</td>
<td>structural number</td>
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<td>USASI</td>
<td>United States of America Standards Institute</td>
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### Acronyms and Abbreviations Cont’d

**Zoning Districts**

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<td>R-H4</td>
<td>Residential Multifamily Four Stories</td>
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<td>R-HH</td>
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CHAPTER 1
ADMINISTRATIVE

101 GENERAL AND DEFINITIONS
102 AUTHORITY
103 JURISDICTION
104 RELATED LEGISLATION
101 GENERAL AND DEFINITIONS

101.1 PURPOSE: The purpose of this Chapter is to provide rules, regulations, and standards to guide the development of land and structures thereon within the jurisdiction of the GBPA to promote the public health, safety, convenience, and general welfare. This Chapter shall be administered to:

1) Ensure orderly growth and development of sound and economically stable communities, and the creation of healthy living environments

2) Foster the conservation, protection, and proper use of land

3) Require adequate provision of necessary facilities for traffic and pedestrian circulation, utility service, and other public services

4) Protect purchasers against acquiring lots, parcels, or units that are unusable or un-developable

5) Ensure the availability of public open spaces in land developments for recreational and educational purposes.

This Chapter is intended to aid in the coordination of land development in the community in accordance with orderly physical patterns and to implement the master plan, or parts, thereof, and such zoning regulations and other measures in furtherance of such master plan as may have been or may hereafter be adopted.

101.2 DEFINITIONS: The following words, terms, and phrases, when used in this Code, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words in the plural number include the singular, and words in the singular number include the plural. The word "shall" is always mandatory and not merely directory.

(A) Decorative Masonry Wall: A wall of masonry composition, at least four ft. 6 inches in height, with a struck natural, painted, stuccoed, or painted struck block finish on both sides with a continuous concrete cap. For the purpose of this definition, a combination of fence and landscaping that creates a satisfactory buffer shall be considered acceptable substitutes for a decorative masonry wall.

(B) Development Agent or Agent: The duly appointed Agent of GBPA empowered to act upon all matters pertaining to this Code.
(C) Easement of Servitude: A strip reserved by the subdivider for public utilities, drainage, and other public purposes the title to which shall remain in the property owner, subject to the right of use designated in the reservation of the servitude.

(D) Final Plat: The final tracing, map or drawing, or chart, on which the subdivider's plan of subdivision is presented to GBPA for approval, and which, if approved, will be submitted to GBPA for recording.

(E) Flood Criteria: The minimum finished grade elevation required for all lands as established and shown on the GBPA Flood Map, as the same may be modified from time to time.

(F) Lot: A portion of a subdivision or parcel of land, however designated, intended as a single building site or unit for transfer of ownership or for development.

(G) Official Map: The map established by GBPA showing the streets, highways, and parks laid out, adopted, and established by GBPA or additions thereto resulting from the approval of subdivision plats by the governing bodies and the subsequent filing of such approved plats.

(H) Overall or Master Plan: A comprehensive plan that indicates the general location recommended for the various functional classes of public works, places, and structures and the general physical development of the applicable area and includes any unit or part of such plan separately adopted and any amendment to such plan or pairs thereof shall be adhered to in principle.

(I) Preliminary Plat: A preliminary map, sketch, drawing, or chart indicating to a reasonable degree the location and layout of the subdivision submitted for approval.

(J) Plat Division of GBPA: The competent staff, including a professional land surveyor, of GBPA created to review plats or an independent land surveying firm under contract by GBPA to review plats. By definition, the independent land surveying firm shall not be the same as the land surveyor recording the plat so as to prevent any conflict of interest.

(K) Right-of-Way: A parcel of ground reserved or dedicated by the subdivider, or deeded by the owner, for public use.
Streets, Service Streets, Easements, and Right-of-Ways (ROWs):

1. **Arterial Street**: A fast or heavy traffic street of considerable continuity and used primarily as a main traffic artery.

2. **Collector Street**: A street that carries traffic from minor streets to arterial streets, including the principal entrance streets of a residential development and streets for circulation within such a development.

3. **Minor Street**: A street used primarily for access to abutting properties, or in some cases a connecting street between subdivisions not adjoining.

4. **Loop Street**: A street used primarily for access to interior lots in a block, beginning and terminating at different points on the same abutting street.

5. **Dead End Street or Cul-de-sac**: A minor street with only one outlet terminating at one end, and may include a turnaround.

6. **Service Street or Alley**: A minor way used primarily for vehicular service access to the back or the side of properties otherwise abutting on a street.

7. **Driveway**: A minor way providing vehicular access onto a private property or a public way providing vehicular access to house groups containing not more than eight houses.

8. **Width of Street**: The shortest distance between the lines delineating the ROW of a street.

9. **Marginal Access Street**: A minor street that is parallel and adjacent to arterial streets and that provides access to abutting properties and protection from through traffic.

10. **Mapped Street**: Any approved street shown on an official map, or the projection of an existing street through an unsubdivided parcel of land, whether the street is dedicated or in existence or not. Centre lines for these streets shall be determined by GBPA.

11. **Limited Access Line**: A designated line across which there shall be no vehicular access.
(M) Subdivider: Any individual, firm association, syndicate, copartnership, corporation, trust, or any other legal entity commencing proceedings under this Code to affect a subdivision of land hereunder for themself or for another.

(N) Subdivision: The division of land into one or more lots, sites, tracts, or parcels or however otherwise designated from a larger tract or parcel for the purpose of transfer of ownership, leasing, or building development.

The dedication of a road, highway, street, alley, or easement through or on a tract of land regardless of area.

The resubdivision of land heretofore divided or platted into lots, sites, or parcels.

(a) Major Subdivision: Any subdivision, other than the creation of cooperative or condominium units, not classified as a minor subdivision.

(b) Minor Subdivision: Any subdivision, other than the creation of cooperative or condominium units, which meets either of the following conditions:

(1) The division of a parcel of land for the purpose of enlarging an adjoining lot, notwithstanding that such adjoining lot, as enlarged, may still be a nonconforming lot pursuant to the terms of this Code; provided that the remaining parcel does not, because of such division, become a nonconforming lot.

(2) The division of land qualifying for no more than five dwelling units according to the development intensity map into no more than five lots, each of which has frontage on, and access to, a pre-existing and maintained public or private street; provided that such division of land complies with the residential density limitations of Section Code; provided that no new public or private street is created; and further provided that, in the opinion of the Director of Building and Development Services, no offsite or off-tract drainage facility or easement, or other public dedication or improvement, is necessary to satisfy any requirement or regulation of this land development code.
102 AUTHORITY

These Subdivision requirements are adopted under the authority of the Hawksbill Creek, Grand Bahama Deep Water Harbour and Industrial Area Act, 1955.

103 JURISDICTION

These Subdivision requirements apply to all areas within the Boundaries of the GBPA.

104 RELATED LEGISLATION

These requirements shall govern the planning and development of all subdivisions within the boundaries of the GBPA, but otherwise subject to section 2 (Application of Act), part 1 (Introductory Provisions) of the Bahamas Government’s PLANNING AND SUBDIVISION ACT 2010.
CHAPTER 2

SUBDIVISION PROCEDURE

201 APPLICATION OF CHAPTER

202 PRELIMINARY CONFERENCE

203 COOPERATIVES AND CONDOMINIUMS

204 MINOR SUBDIVISIONS

205 MAJOR SUBDIVISIONS

206 PLATS AND PLATTING
201 APPLICATION OF CHAPTER

No person, firm, corporation, or any other association shall create a subdivision of a tract of land anywhere in the GBPA except in conformity with this Chapter.

(A) This Chapter shall be applied to, and shall be complied with, as to all subdivisions of land or structures thereon that occur within the GBPA, except for:

(1) The subdivision of designated lots of a previously approved and recorded subdivision that are under common ownership, provided that:

   (a) No lot lines are relocated or adjusted.

   (b) No individual lot designated on the recorded plat is subdivided.

   (c) Each of the subdivided lots or parcels of land meets the minimum GBPA code requirements for the development of at least one dwelling unit. However, this exception shall not apply where the development of the property would result in the creation of a nonconforming lot, structure, or use.

(2) A division of property by testamentary or intestate provisions.

(3) A division of property by court order.

202 PRELIMINARY CONFERENCE

The subdivider or their agent, prior to the submission of a preliminary plat, shall appear before the Development Agent for a preliminary conference in order that they may become familiar with the subdivision requirements and provisions affecting the territory in which the proposed subdivision is located.

203 COOPERATIVES AND CONDOMINIUMS

203.1 Authorized generally. Whenever a subdivision is approved by GBPA pursuant to this Chapter, such approving authority shall require, as a condition of such approval, the recording of properly executed and binding restrictive covenants or condominium or cooperative declarations containing provisions specifically required by the Planning and Development Volume and such other provisions as are necessary to effectuate the regulations and purpose of this Chapter. The covenants or documents shall also include a limitation on the amendment of such required provisions without the written consent of GBPA.
Creation of cooperative or condominium units. No cooperative or condominium units may be created within the GBPA unless and until the cooperative or condominium documents required by law to be recorded are first submitted to and approved by GBPA pursuant to the following:

A. Existing structure only. When each cooperative or condominium unit created (not to include common elements) consists only of a portion of an existing structure and not of any land area, the cooperative or condominium documents shall be submitted to GBPA for approval as for a development permit. Such documents may only be approved by the Director of Building and Development Services, and a development permit issued if each individual unit thus created complies with all requirements of this planning and development code regarding any required minimum unit size or any other regulation specifically relating to such a subdivision.

B. Land or new structure included. When any cooperative or condominium unit to be created includes an area of land or a portion of a structure not yet constructed, the cooperative or condominium documents shall be submitted to GBPA for approval as for a development permit. The cooperative or condominium documents may not be approved by GBPA, and no development permit may be issued, unless each unit thus created and the site as a whole, including common elements, complies with all applicable requirements of the planning and development code including minimum unit size, if any.

204 MINOR SUBDIVISIONS

204.1 Generally. No minor subdivision may occur within the GBPA unless and until such subdivision is approved in accordance with the requirements of this division.

204.2 Application. Application for approval of a minor subdivision shall be made as for a development permit pursuant to the terms of the GBPA Code. Included with such application shall be the original and two paper copies of a survey by a professional land surveyor registered in the Bahamas, certified to meet minimum technical standards. The original of the survey shall be drawn on a twenty-four (24)-inch by thirty-six (36)-inch linen or stable base film with a three (3)-inch margin on the left for binding and a one-half (1/2)-inch margin on the other three sides. Additional information to be shown on the survey shall include:

(1) The lot lines, dimensions, and acreage for each lot being created

(2) The acreage of the total parcel being subdivided
(3) The location of public or private streets abutting the parcel being subdivided, and all ROWs within the parcel being subdivided

(4) A legal description for each lot being created, which may accompany the survey if not possible or practicable to designate thereon

(5) Any structures located on the parcel being subdivided

(6) A notation in large or bold-face type or printing that "THIS IS NOT A RECORD PLAT"

(7) A GBPA approval statement, to be signed by a GBPA representative, certifying that the minor subdivision conforms to all GBPA applicable ordinances and regulations

204.3 Review of Application. GBPA shall review the application for a minor subdivision to determine if the proposed subdivision qualifies as a minor subdivision. If it does not, the application shall be returned to the applicant with a notation thereon that the application must be resubmitted as an applicant for approval of a major subdivision. If GBPA determines that the proposed subdivision qualifies as a minor subdivision, GBPA shall review the application and shall approve the proposed subdivision only if each lot or parcel of land thereby created complies with all provisions of this Planning and Development Volume and may be developed pursuant to the requirements of this Planning and Development Volume. When a minor subdivision is approved, GBPA shall sign the approval statement on the original survey and return the original survey to the applicant for recording.

204.4 Recording. No development permit shall be issued for the subdivision until the approved survey is recorded by GBPA, with all required signatures and the recorded book and page number indicated thereon.

205 MAJOR SUBDIVISIONS

205.1 Requirement. No subdivision of lands within the GBPA that is defined as a major subdivision may occur or be occasioned by the owner of the subdivided lands unless and until a final subdivision plat has been approved by GBPA and recorded as required in this division.

205.2 Procedure. Application for approval of a major subdivision shall be as for a development permit, and detailed in the Planning and Development Volume. GBPA approval shall be of the preliminary plat, which may not be approved unless each lot or parcel of the proposed subdivision and the entire parcel being subdivided are in compliance with all requirements of
this Planning and Development Volume. The procedure for preliminary plat approval shall be as follows:

A. The development permit application shall be accompanied by a preliminary plat prepared in conformance with the requirements of the Planning and Development Volume.

B. If the proposed subdivision includes, or if GBPA requires as a condition of approval, that the subdivider dedicate land or contribute funds toward public facilities, preliminary plat approval shall not be complete unless and until such required dedication or contribution is reviewed and approved by GBPA.

C. No development permit shall be issued for the land subdivision unless and until the remaining requirements of this Chapter relating to required improvements, construction plans, submission, approval, and recording of final plat, are completed in accordance herewith.

D. Preliminary plat approval shall be effective and valid for a period of two (2) years. GBPA may, however, extend this effective period for an additional two (2) years provided that at the time such an extension is granted, the preliminary plat continues in compliance with all requirements of this planning and development code. If all requirements for approval of a final subdivision plat, and the recording of such plat, are not completed within the time period for which preliminary approval is valid and effective, such preliminary approval and all rights conferred thereby shall be terminated and expire.

Rights conferred by preliminary approval. Preliminary approval shall, except as set forth in this Section, confer upon the applicant the following rights during the period in which such approval is valid and effective:

A. The general terms and conditions upon which the preliminary approval was granted shall not be changed, as applied to such subdivision, including permitted use and residential density limitations; layout and design standards for lots, streets, and other improvements; minimum lot sizes; yard dimensions; and required improvements; except that nothing in this subsection shall be construed as preventing GBPA from modifying, by ordinance, such terms and conditions as it relates to public health and safety.

B. The developer may commence such site work as is approved by GBPA in preparation for installation of improvements, as required by Section 203, but shall not commence the actual installation of such improvements until construction plans are approved and a
bond or other security provided in accordance with the Planning and Development Volume.

Final plat review and approval. After completion of the construction improvements, the final plat and two copies thereof shall be submitted to GBPA for final approval in accordance with the following procedure:

A. The final plat shall be prepared in accordance with the requirements of Section 206, Final Plat, and shall be accompanied by:

1. A letter from the applicant identifying all required improvements constructed pursuant to Section 203, the cost of each such improvement, and the total cost of all improvements.

2. An as-built survey identifying the location of all road and drainage improvements and underground utility facilities located in proposed public ROWs.

3. A letter from an qualified engineer licensed by the GBPA certifying that the final plat conforms to the approved preliminary plat and that the required improvements conform to the approved construction plans.

4. A surety bond, irrevocable letter of credit, or equivalent security in the amount of the total cost of all required improvements constructed pursuant to Section 203, in a form approved by the GBPA Attorney, conditioned upon the satisfactory repair, replacement, and maintenance of all required improvements for a period of two (2) years following the completion and approval thereof by GBPA.

B. Upon receipt of a sufficient final plat and all required documents to accompany such final plat, GBPA shall place the final plat on the agenda of a GBPA meeting for acceptance and approval by GBPA.

C. The development permit shall not be issued by GBPA until GBPA has recorded the final plat on the public records of the Bahamas and GBPA has the plat book and page number where such plat has been recorded. The exception to this is that a development permit will be necessary for the construction improvements that must be completed prior to approval of the final plat.
206 PLATS AND PLATTING

206.1 Preliminary Plat: The preliminary plat shall show on a map, sketch, or drawing of a proposed subdivision, all data and facts required by the agent to determine whether the proposed layout of the land in the subdivision is satisfactory from the standpoint of public and private interest. The preliminary plat shall be designed and drawn by a qualified land surveyor licensed by the GBPA or Qualified engineer licensed by the GBPA. The preliminary plat shall be clearly and legibly drawn or reproduced at a scale of not less than one (1) inch equal to one hundred (100) feet.

206.1.1 The following information shall be a part of, or shall be submitted with the preliminary plat.

(1) A key map showing the entire subdivision and its relation to the surrounding areas.

(2) Proposed subdivision name and identifying title. Location, direction, and distance from a permanent, easily identifiable monument or landmark

(3) Acreage of the tract to be subdivided to the nearest tenth of an acre. Existing and proposed contours at one (1)-foot vertical intervals for lands of lesser slope. Datum of all elevations shall be that of the Freeport Datum.

(4) Name and address of record for proposed owner, subdivider, and person preparing the preliminary plat.

(5) Location and dimensions of property lines, existing easements, buildings, water courses, and other essential features.

(6) Location, names, and dimensions of existing and proposed streets, highways, easements, parks, and other public spaces, and similar facts regarding property within two hundred (200) feet of the subdivision.

(7) The location of any existing and proposed sewers, water mains, gas lines, electricity lines, or any underground or overhead utilities, culverts, and drains on the property to be subdivided. When individual water supply or sewage disposal systems
are proposed, the plans for such systems shall be approved by GBPA. When a public sewer system is not available, the subdivider may be requested to have percolation tests made and submit the results with the constructions plans.

(8) The proposed lot lines with dimensions.

(9) Date, north point or arrow, and scale (both graphic and written).

(10) A note or statement that the property is or is not located in a special flood hazard area on the GBPA Flood Map.

(11) Location of nearest available subdivision or public water supply system.

(12) Location of nearest available electric utility or any other information pertaining to proposed electric supply.

(13) A copy of any restrictive covenants or deed restrictions applying to the land being subdivided.

(14) A written summary of the proposal giving information as to the overall development plan with preliminary data on the planned number of dwelling units or other permitted uses contemplated so that the effects of the development can be determined to ensure that the development is in accordance with this Planning and Development Volume, and any other requirements that are established by GBPA.

(15) Where the preliminary plat submitted covers only a part of the subdivider's entire holding, a sketch of the prospective future street system of the unsubdivided part may be required and will be considered in the light of adjustments and connections with the street system of the part submitted.

(16) Any and all other information that the subdivider may wish to integrate on their preliminary plans as otherwise required for development permit approval.
The subdivider shall file one copy of the preliminary plat with the Agent.

Final Plat

Conformity to Preliminary Plat: The final plat shall have incorporated all changes or modifications as required to make the preliminary plat conform to the requirements of this Chapter. Otherwise it shall conform to the preliminary plat, and it may constitute only that portion of the approved preliminary plat that the subdivider proposed to record and develop at the time, provided that such portion conforms with all requirements of this Chapter and meets with the approval of GBPA and/or its Agent(s).

Preparation: The final plat shall be prepared by a qualified land surveyor licensed by the GBPA or qualified engineer licensed by the GBPA. The final plat shall be clearly and legibly produced on non-erasing photo mylar to a size of twenty-four (24) inches by thirty-six (36) inches and to a scale not less than one (1) inch equal to one hundred (100) feet.

Title: The final plat shall have a title or name. If the plat be a town, city, or village, the full name of such town, city, or village must appear as the title or name of the plat subdivision. If the land platted is to be an addition to a subdivision already platted, then the title of the plat shall include, the name of such addition and the subdivision. GBPA shall disapprove the name similar to any previously approved plat within the jurisdiction that may cause confusion as to the status or the location of any platted property.

Legal Description

There shall be written or printed upon non-erasing photo mylar a full and detailed description of the land embraced in the plat, together with a location sketch showing the plat's location to the nearest permanent easily recognizable landmark. The description must be so complete that from it, without reference to the plat, the starting point can be determined and the outlines run.

If a subdivision of a part of a previously recorded plat is made, the previous lots and blocks to be re-subdivided shall be given.

If the plat be a re-subdivision of the whole of a previously recorded plat, the fact shall be so stated. Vacating of previously platted lands must be accomplished in the manner designated by the Agent.
The plat shall contain the names of adjacent subdivisions.

The plat shall contain the names or numbers and width of streets immediately adjoining plat.

The plat shall show the location and dimensions of all plat boundaries.

Bearings and distances to the nearest established street lines, permanent monuments, or other recognized perimeter landmarks shall be accurately described on the plat.

Accurate location of all monuments shall be shown on the plat.

The plat shall show length of all arcs, radii, internal angles, points of curvature, and tangent bearings.

The width of the lot at the front building setback line shall be shown on the plat where lots are located on a curve or when side lot lines are at angles less than eighty-seven (87) degrees or more than ninety-three (93) degrees.

The name or numbering and ROW width of each street or other ROW shall be shown on the plat.

The numbering of all lots and blocks shall be shown on the plat. All lots shall be numbered progressively, or in blocks progressively numbered, except that blocks in numbered additions bearing the same name shall be numbered consecutively throughout the several additions. Excepted parcels must be marked "NOT PART OF THIS PLAT."

The plat shall show plat restrictions as to type and use of water supply, sanitary facilities, use and benefits of water areas and other open spaces and odd-shaped and substandard parcels, and restrictions of a similar nature.

The plat shall show all areas reserved or dedicated for public purposes. No strip or parcel of land shall
be dedicated for public use unless it is sufficient in size and area to be of some practical use or service.

(12) The plat shall show the dimensions of all lots and angles or bearings.

(13) The plat shall show the location, dimension, and purpose of any easements and minimum setback lines where required by the Development Agent.

206.2.6 Certification: The plat shall contain a certification by a qualified land surveyor licensed by the GBPA or qualified engineer licensed by the GBPA to the effect that the plat represents a survey made by him or her, and that all monuments shown thereon actually exist, and that their location is correctly shown.

206.2.7 Adoption by Owner: An acknowledgement by the Owner of his or her adoption of the plat, and of the dedication of streets and other public areas and the consent of any mortgage holders to such adoption and dedication, shall be shown on the plat. If existing ROW is to be closed, the purpose of the closing must be stated on the plat.

A statement on the final plat signed by GBPA or its designated Agent stating that lands dedicated for public use are accepted.

The signature and seal of GBPA.

206.3 Other Data Required with Plat

(1) Restrictive covenants desired by the developer provided that they do not violate existing requirements. Restrictive covenants shall be required covering the same restrictions included in Section 206.2.5.10., restrictions controlling building lines, establishment and maintenance of buffer strips and walls, and restrictions of a similar nature.

(2) Current opinion of title from any attorney authorized to practice law in the Bahamas.

(3) Certification that all taxes and assessments have been paid on the land within the proposed subdivision or receipted tax bills.

(4) If a zoning change is involved, certification from GBPA that the change requested has been approved and is in effect, and that the
size of lots and other features shown on the plat conform to all zoning requirements. Signing by GBPA or its Agent shall constitute such certification.

(5) A fee, to defray the cost of checking the recording the plat, shall be paid to the Agent in accordance with the GBPA "Schedule of Fees."

206.4 Final Approval

206.4.1 No plat shall be entitled for recording until the plat is signed by all required parties, certifying that the plat appears to conform to all of the requirements of this Chapter.

206.4.2 In the event the plat has been rejected, the Agent shall notify the subdivider or their engineer in writing with all reasons for such rejection.
CHAPTER 3

REQUIRED IMPROVEMENTS

301  GENERAL

302  PUBLIC LAND RESERVATIONS AND ACCEPTANCE

303  REQUIRED IMPROVEMENTS
301  GENERAL

301.1 Size: No parcel or tract of land shall be subdivided into lots or parcels of land containing less than twenty (20) acres unless certain improvements are constructed in accordance with this section.

301.2 Access: No parcel or tract of land shall be subdivided into lots or parcels of any size that do not abut or have access to by means of a public street or an existing public road or street.

301.3 Conformance: The proposed subdivision and required improvements shall conform in principle to the Overall Plan and the provisions of the Planning and Development Code and the Building Code.

301.4 Preliminary Plat: Preliminary plat approval shall be conditioned upon the applicant installing all required monuments and constructing or installing all streets, street signs, drainage facilities, sewage treatment facilities, and other improvements as are necessary to bring the proposed subdivision in full compliance with all requirements of the Planning and Development Volume, in accordance with the following requirements and the provisions of this Chapter:

A. All streets and other improvements in proposed subdivisions shall be constructed in accordance with all specifications as provided in this Chapter and as may be adopted by GBPA as "Subdivision Improvement Construction Requirements."

B. All necessary street signs shall be installed by the applicant in accordance with the prevailing scheme of identifying public and private streets in GBPA.

C. All necessary drainage and sewage treatment facilities shall be constructed as required and approved by GBPA so as to meet the minimum requirements of this Planning and Development Volume and as to accomplish the intent and purpose of this Planning and Development Volume.

302  PUBLIC LAND RESERVATIONS AND ACCEPTANCE

302.1 Definition of Public Street: Any street dedicated to the general public, any private street that guarantees rights of access by contract or covenant to the lot or parcel owner may be considered to be a public street within the intent of this section.

302.2 Reservation: All public streets, water conservation easements, and any land reserved for public use shall be reserved to GBPA or its designated Agent.

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302.3 Acceptance: The reservation of public land shall not constitute an acceptance of the reservation. The acceptance of the reservation shall be indicated by a statement on the final plat signed by GBPA or its designated Agent.

303 REQUIRED IMPROVEMENTS

Prior to the granting of the final approval of a subdivision, the subdivider shall have installed the following:

303.1 Monuments:

303.1.1 Monuments shall be placed at all block corners, angle points, points of curves in streets, and at intermediate points, as shall be required by the Agent.

303.1.2 The monuments shall be of such material, size, and length as may be approved by the Agent, and he or she may, if deemed advisable, waive installation in certain instances. Such installation shall be in accordance with Chapter 4, of this Code.

303.2 Streets: Construction, Inspection, and Approval: All streets shall be constructed and surfaced in accordance with the applicable specifications and standards contained in Chapter 4, of this Code. Such construction shall be subject to the inspection by the Agent, and subjected to issuance of permits. Where street construction complies with specifications, such installation shall be approved. No other permits of any kind for construction of streets shall be required.

303.3 Curbs and Gutters: Curbs and gutters where required by the Agent shall be provided in accordance with the specifications and standards contained in Chapter 4, of this Code. Such construction shall be subject to the inspection of the Agent and to the issuance of permits therefor.

303.4 Sidewalks:

303.4.1 Spaces allotted for sidewalks shall be required in all residential, office, and business areas, and along all arterial highways and streets; except, that in areas zoned in the estate and agricultural zone classification, or other zone classifications
requiring lots of similar frontage and area, no sidewalks shall be required.

303.4.2 Sidewalks will be required in special cases, regardless of zone classification, as directed by the Agent.

303.5 Street Signs: Street name signs shall be placed at all street intersections within or abutting a subdivision. Such signs shall be of a type approved by the Agent and placed in accordance with the standards contained herein.

303.6 FILL:

303.6.1 Fill shall be placed in the entire subdivision to the elevations, after settlement, indicated on the construction plans that shall be not less than plus 7.0 Freeport datum whenever financially practical or as directed by the Agent with other special conditions attached.

303.6.2 The type of fill shall be satisfactory to and meet with the approval of the Agent, who shall require soil tests of the fill and the underlying material in areas in which streets or other public facilities are to be located.

303.6.3 The fill for the balance of the subdivision may be certified by a qualified engineer licensed by the GBPA as to type and method of placement or the subdivider shall submit a statement as to type and method of placement, the latter statement being for information not certification purposes with ultimate certification by a professional engineer.

303.7 Water Supply: An adequate supply of potable water shall be provided for as defined in Chapter 4, of this Code.

303.8 Sewage Treatment: An adequate means of sewage treatment and/or disposal shall be provided for as defined in Chapter 4, of this Code.

303.9 Electrical Utilities: Provisions shall be made for electrical utilities where required, or in the case of a private
generating unit, such unit will comply with the current GBPA Building Code and the Canadian Electrical Code. Private generating units are only permitted as standby electrical generating units.

303.10 Drainage:

303.10.1 General: The subdivider shall plan all drainage for its subdivision in accordance with the directions of the Agent and the standards contained in Chapter 4, of this Code. The design for drainage of the subdivision must be adequate to provide for drainage of the proposed subdivision and adjacent watershed areas, and design of drainage structures must provide for drainage of the subdivision and adjacent watersheds after complete development of the total area. Where ditches and canals are required, ROWs shall be provided for future needs in accordance with any and all requirements proscribed by GBPA.

303.10.2 Flood Criteria: Areas subject to periodic or frequent flooding shall be filled to the elevations required by the flood criteria and rainfall records kept in the office of the Agent and obtainable upon request by the subdivider.

303.10.3 Permits and Plans: No individual, partnership, or corporation shall construct, deepen, widen, reroute, or alter any existing drainage way, ditch, drain, or canal without first obtaining a written permit from the Agent. Plans for all such work shall be subject to the approval of the Agent before such permit is issued. All such work shall be done subject to the approval of GBPA and carried out under the supervision of the GBPA or under the supervision of an individual or entity approved by the GBPA.

303.10.4 Canals: No canals, waterways, or other access to salt water shall be constructed more than three thousand (3,000) feet from the shoreline unless prior permission in writing is given by the Agent and environmental due diligence is shown.

303.10.5 Docks, Piers and Jettys: No dock, pier, or jetty, including mooring piles, shall be constructed to extend more than twenty-six (26) feet or one third the width of any canal or waterway, whichever is shorter, from mean high water (mhw) of the shoreline or from any seawall or bulkhead. No dock, pier, or jetty shall be constructed on lands lying below mean high water without proper authorization from
the Agent and the necessary environmental due diligence shown.

303.10.6 Salinity Barriers: Adequate salinity barriers shall be provided for in the area of any canal construction as required by the Agent.

303.10.7 ROWs: Whenever any drainage way, stream, or surface drainage course is located or planned in any area that is being subdivided, the subdivider shall reserve such stream or drainage course and an adequate ROW necessary for maintenance, future expansion, and other purposes along each side of such stream or drainage course as is determined by uniform standards prescribed by GBPA.

303.10.8 Stormwater: Adequate provision shall be made for the disposal of stormwater subject to the provisions and standards contained in Chapter 4, of this Code.

303.10.9 Contour Maps: A contour map shall be made of the area comprising the subdivision and such additional area as may be required by the Agent necessary to include all watersheds that drain into or through the property to be developed, provided that the map of the adjacent areas may be prepared from existing maps or other data available.

303.10.10 Offsite Drainage: Offsite drainage shall be mutually coordinated and approved between the subdivider and the Agent.

303.11 ENVIRONMENTALLY SENSITIVE LANDS (WETLANDS AND OTHER DESIGNATED ENVIRONMENTALLY SENSITIVE LANDS, ETC.):

Permits and Plans: No individual, partnership, or corporation shall construct, amend, or enhance within designated environmentally sensitive lands without first obtaining a written permit from the Agent. Plans for all such work shall be subject to the approval of the Agent before such permit is issued. Approval of the environmental standards and conditions is also required.
CHAPTER 4 DESIGN DETAILS

401 GENERAL
402 GENERAL CONSTRUCTION PLANS
403 COASTAL AND OTHER WATERFRONT CONSTRUCTION
404 LAYOUT
405 MONUMENTS
406 STREETS AND ROADS
407 BRIDGES AND CULVERTS
408 DRAINAGE
409 FILL
410 WATER SUPPLY
411 SEWERAGE AND SEWAGE TREATMENT
412 ELECTRIC AND COMMUNICATION UTILITIES
401  GENERAL

401.1 The proposed subdivision shall conform in principle to the overall master plan and the requirements of this Code, and the arrangement, extent, width, grade, and location of all streets, lots, blocks, and other improvements will be considered in their relation to existing and planned streets, topographical conditions, public safety, convenience, and in their appropriate relation to the proposed uses of the land to be served by such improvements, otherwise the design standards shall conform to the provision found herein.

401.2 When private streets are included within an approved subdivision and are designed or constructed to standards less than those required for public streets, the required covenants or condominium or cooperative declarations shall specifically include a notice to lot or unit purchasers that the streets within such subdivision are not public streets, are to be maintained by the owners at their own expense, and are intended to remain private streets in perpetuity.

401.3 Construction improvements must be installed in all that area for which a preliminary plat is submitted before the approval of the final plat. The GBPA may accept a bond guaranteeing the construction of the required improvements in lieu of this requirement.

401.4 In cases of partial subdivision of a tract, the street, water, and sewer systems shall be designed and built to serve the entire area, or designed and built in such a manner as to be easily expanded to service the entire area.

402  GENERAL CONSTRUCTION PLANS

402.1 General Construction Plans. Following the approval of a preliminary plat, the subdivider shall submit construction plans and specifications for review and approval by GBPA in accordance with the following:

(A) The subdivider shall submit an original and two copies of complete construction plans and specifications for all required roads, drainage improvements, bike paths, and any other improvements required to be installed or completed by the subdivider. These plans shall be prepared by a qualified engineer licensed by the GBPA and shall indicate the exact manner and location that such improvements are to be installed. The subdivider may submit and secure approval of construction plans in phases so as to facilitate staged construction. However, the subdivider shall not begin construction of any such improvements prior to the approval of the construction plans therefor and the issuance of all applicable permits for such construction. The construction plans shall be...
clearly and legibly drawn or reproduced at the same scale as the preliminary plat and shall include at least the following:

(1) A topographical map of the subdivision.

(2) A complete drainage plan identifying the details of all construction of all drainage facilities, including pipes, culverts, drains, manner of construction, pipe sizes, and calculations establishing the adequacy of the proposed plan.

(3) Plans and profiles of all proposed streets. Where the proposed street intersects an existing street, elevation and other pertinent details shall be shown on the construction plans for the existing street for a minimum distance of three hundred (300) feet from the point of intersection. A centreline profile of all proposed streets shall be provided and shall include the existing grade, proposed drainage structures, percent of proposed grade, and vertical curve data including elevation of the p.v.i., p.v.c., and p.v.t. and length of curve. The profile shall be drawn to a scale of not less than one (1) inch equal to five (5) feet on the vertical plane and one (1) inch equal to fifty (50) feet on the horizontal plane. The return calculations and grades at intersections shall be provided. Profiles of ditches and swales shall be submitted along with cross sections of ditches and swales every fifty (50) feet.

(4) Typical road cross sections for all new streets. The cross section shall clearly indicate the type and width of paving, location of any bike paths or medians, maximum slope of embankments, swales and berms, and all drainage structures and cross-drains. Cross sections of the proposed streets and existing grade shall be provided at a minimum of fifty (50)-foot intervals along the entire length of the street. Cross sections shall be drawn to a scale of not less than one (1) inch equal to five (5) feet for the horizontal and vertical planes. Each cross section shall specify the quantity of cuts and rills in square feet, stripping in cut and fill in linear feet, and topsoil in linear feet.

(5) Inspections and approval. No facility installed underground may be covered over until the facility has been inspected by GBPA. Other periodic inspections may be required by GBPA. Construction of required improvements shall not be complete unless and until all the improvements have been finally inspected and approved by GBPA.
(B) The subdivider may not begin construction of required improvements until construction plans are approved by GBPA and a construction bond with good and sufficient surety, an irrevocable letter of credit, or equivalent security is provided to GBPA in an amount equal to the cost of all required improvements, and in a form approved by GBPA, conditioned upon the satisfactory completion of required improvements in accordance with the approved construction plans during the effective period of the preliminary plat approval.

402.2 Construction Traffic Maintenance and Detour Regulations

(A) General. Traffic safety and traffic control devices shall be employed on all private and public construction work within the GBPA ROW. Such measures shall be established and provided in conformance with these regulations.

(B) Information Concerning Traffic Maintenance and Detour Plans and Specifications:

A. Must have construction plans reviewed. All private and public agencies, their contractors or representatives shall submit to GBPA two sets of plans for construction work within the GBPA ROW.

B. Provisions of traffic maintenance or detour plans and specifications.

1. Upon such review, GBPA may, at its discretion, specify use of an applicable traffic maintenance plan and specification shown in Standard Details No. R-19 series, requiring traffic detours shall include the selection of a suitable route plus a sketch showing the plan and specification to be used.

2. Traffic maintenance and detour plans, specifications and provision for extensive construction projects involving arterial streets ROWs, may be supplied on a site-to-site basis by GBPA.

3. GBPA may specify special traffic maintenance or detour plans, specifications, and provisions if, in its opinion, such plans, specifications, and provisions shown in Standard Details No. R-19 series, are not applicable to a given project.
C. Responsibility for providing, installing, and maintaining traffic control and warning devices.

All traffic control and warning devices so specified shall, unless otherwise specified by GBPA, be furnished and installed according to the Standard Details (No. R-19 series), and maintained by the agency or contractor involved. Supervision of traffic control and safety by a Uniformed Police Officer, when specified, shall be furnished by the agency or contractor without cost to GBPA. Further, any and all additional traffic measures deemed necessary by such officer shall be carried out by the agency or contractor without cost to GBPA.

(C) Pre-Construction Notice Requirements

A. Advance Notice to GBPA. Minimum advance notice periods, as specified below, shall be required for all construction projects at sites involving traffic or pedestrian signal installations. Such notice shall be given by direct contact with GPBA.

1. Projects requiring physical modifications of existing facilities – two (2) weeks notice.

2. Projects not requiring physical modifications – forty-eight (48) hours notice.

B. Advance Notice to Law Enforcement and Fire Protection Services. When traffic detours are used, law enforcement and fire protection services shall be notified by the agency or contractor involved, twenty-four (24) hours in advance of the detour date. Such notification, in connection with emergency construction work, shall be given immediately.

(D) Traffic Maintenance or Detour Regulations for Emergency Construction Projects. Traffic maintenance or detour measures shall be employed during emergency work on or within a roadway. Such measures shall be based, insofar as possible, upon the applicable plans and specification shown in Standards Details No. R-19 series.

(E) Limitation on Beginning Construction Work. Construction on all projects, or the portion thereof, requiring traffic maintenance or
detour provisions shall not begin without implementation of such plans and specifications authorized by GBPA.

(F) Storage of Materials on Pavement. If excavated or other material is permitted to be stored adjacent to or partially upon a roadway pavement, such material shall be adequately marked for traffic safety at all times.

403 COASTAL AND OTHER WATERFRONT CONSTRUCTION

403.1 General Information

(A) Purpose. It is the purpose of this Section to prescribe minimum standards for design and construction of horizontal coastal and other waterfront structures.

(B) Scope. Requirements of this Section apply to all coastal construction, such as excavation, dredging, fillings, and waterfront construction in, upon, or contiguous to tidal and baybottom lands and in, upon, or contiguous to those canals and all waterways under the direct control of GBPA.

Said coastal construction includes, but is not limited to, excavation, dredging, fillings, causeways, artificial nourishment of beaches, quays, and related horizontal structures (see Building Code for other structures).

403.2 Design Criteria

(A) General. All coastal structures shall be designed by a qualified engineer licensed by the GBPA and all plans submitted to GBPA for approval shall bear their signature and seal and comply with the Building Code and the Planning and Development Code..

(B) Loads. Coastal structures are to be designed and constructed to resist the erosive and corrosive effects of the elements and where applicable to withstand the horizontal and vertical forces or loads listed below:

1. Earth (soil)
2. Water
3. Waves
4. Wind
5. Currents
6. Weight of structure
7. Weight of decks, platforms, or other attachments
8. Pedestrian live load (eighty [80] pounds per square foot
minimum)
9. Vehicular loading (AASHTO-H-20 minimum where vehicular loads are anticipated)
10. Material and equipment stored
11. Anchors or tiebacks
12. Boats, barges, or other vessels

(C) Allowable Stresses. Allowable stresses for structural design of steel, concrete, wood, and other materials shall be as specified in the Building Code.

403.3 Structures – Location, Type, and General Specifications. Any type of construction not prohibited by the Building Code may be approved if it is adaptable to the site conditions and to the purpose of the structure. If the proposed type or method of construction does not have an experience record sufficient to justify approval, GBPA may require special tests or demonstrations to prove the acceptability of the project.

(A) Beach Nourishment. Typical profiles for such projects consist of a fifty (50)-foot level berm at elevation six (6)-foot mean sea level (msl); a 1 on 20 slope from there to mlw; and a 1 on 30 slope seaward to existing bottom.

Special agreement between the upland owner proposing such a project and GBPA may be required in order to adequately protect and permanently safeguard any public rights existing at the proposed site.

403.4 Construction Permit. A permit for construction may be issued to a certified contractor provided:

A. Two sets of construction plans, identical to the approved plans, are presented.
B. Satisfactory evidence is presented that all other applicable approvals and permits have been obtained.
C. The required permit fee is paid.
D. A performance bond has been provided in an amount determined by the Director of Building and Development Services Department but not to exceed one hundred (100) percent of the estimated cost of the structure.
E. It is certified that a qualified engineer licensed by the GBPA has been retained to provide engineering supervision throughout the construction period.
403.5 Information Required Before Final Acceptance. When the structure is complete, and prior to final acceptance, the design engineer shall furnish GBPA a complete set of as-built drawings, together with his or her certification that the structure has been built in accord with the approved plans and specifications as finally revised.

403.6 Maintenance. These minimum requirements are not to be construed as an implication that GBPA proposes to maintain these structures when completed. A coastal structure shall be maintained at all times by the owner including any portion thereof that may extend into public property. All structures that are available for public use shall be maintained by the owner in a safe condition. Maintenance of groins will include periodic adjustments of the height to compensate for changes in the beach profile.

Removal may also be required for a greater public good if the beach profile is being affected drastically by its (groin, bulkhead etc) presence.

404 LAYOUT

404.1 Arrangement

(A) The arrangements of streets in new subdivisions shall make provisions for the continuation of existing streets in adjoining areas.

(B) Where adjoining areas are not subdivided, the arrangement of streets in new subdivisions shall make provisions for the proper projection of streets.

(C) When a new subdivision adjoins unsubdivided land then the new streets shall be carried to the boundaries of the tract proposed to be subdivided where required to promote reasonable development of the adjacent lands or provide continuity of road systems.

(D) Street jogs with centreline offsets of less than one hundred twenty-five (125) feet shall be prohibited unless because of unusual conditions the GBPA determines that a lesser centreline offset is justified.

(E) Dead end streets or cul-de-sacs designed to be so permanently, shall not be longer than six hundred (600) feet, and shall be provided at the closed end with turn around having an outside roadway diameter of at least eighty-four (84) feet, and a street property line diameter of at least one hundred (100) feet. If a dead
end street is of a temporary nature, a similar turn around may be required and provision made for future extension of street into adjoining property, as may be required by the GBPA.

(F) Where a subdivision butts on or contains an existing limited access highway, freeway, parkway, or arterial street, marginal access streets or other such treatment as may be necessary for adequate protection of residential property and to afford separation of through and local traffic may be required.

(G) Minor streets shall be so designed that their use by through traffic will be discouraged.

(H) A tangent of at least one hundred (100) feet long shall be introduced between reversed curves on arterial and collector streets.

(I) When connecting street lines deflect from each other at anyone point by more than ten (10) degrees Fahrenheit, they shall be connected by a curve with a radius adequate to ensure a sight distance as defined in this Code.

(J) Streets shall be laid out so as to intersect as nearly as possible at right angles.

(K) Property lines at street intersections shall be rounded with a radius of twenty-five (25) feet. A greater radius may be allowed in special cases. The GBPA may permit comparable cutoffs or chords in place of rounded corners.

(L) Half streets shall be prohibited, except where essential to the reasonable development of the subdivision. Whenever a half street is adjacent to a tract to be subdivided, the other half of the street shall be platted within such tracts.

(M) No street names or numbers shall be used that will be confused with or duplicate the names of existing streets. Street names shall be subject to the approval of the plat division of the appropriate authority.

(N) Driveways shall be limited to house groups containing no more than eight houses with proper turn around facilities. House groups containing more than eight houses shall be served by a dead end street or cul-de-sac.

(O) Service streets or alleys shall be reserved in commercial and industrial districts, except that the GBPA may waive this
requirement where other provision is made for service access and parking and is adequate for the uses proposed.

404.2 Rights-Of-Way. Street rights-of-way (ROW) widths shall be shown on the final plat and shall not be less than as follows:

A. Arterial streets: One hundred (100)-foot ROW

B. Collector streets: Seventy (70)-foot ROW

C. Minor streets: Fifty (50)- to sixty (60)-foot ROW (as determined by GBPA or its Agent)

D. Minor streets (for industrial areas): Seventy (70)-foot ROW

E. Loop streets: Forty (40)-foot ROW

F. Service streets or alleys: Twenty (20)-foot ROW

G. Driveways: Thirty (30)-foot ROW

404.3 Paving Width. Paving widths shall, in relation to ROW widths or usage, be as follows:

A. Arterial streets: Twenty-four (24)-foot or forty-eight (48)-foot width of paving

B. Collector streets: Twenty-two (22)-foot or forty-four (44)-foot width of paving

C. Minor streets: Twenty (20)-foot width of paving

D. Loop streets: Twenty (20)-foot width of paving

E. Service streets or alleys: Twelve (12)-foot or twenty (20)-foot width of paving

F. Driveways: Twelve (12)-foot or twenty (20)-foot width of paving

Variation of the ROW widths and paving in special cases may be granted only by the GBPA. ROW widths in excess of the standards designated in these regulations shall be required whenever, as a result of topography, landscape buffers, additional traffic lanes, etc., additional width is requested by GBPA.

404.4 Designations. Street names or number shall be used that will not be confusing with or duplicated the names of existing streets. Street names and numbers will be subject to the approval of the GBPA.
Utilities Easements. Easements at least twenty-five (25) feet wide across lots (not including drainage) and, where possible, on the front or centered on rear or side lot lines shall be provided for utilities upon request of a utility and the GBPA. The use of utility easements is highly discouraged.

Drainage Easements. Where a subdivision is traversed by a water course, drainage way, or canal, there shall be provided a stormwater easement, stormwater tract, or drainage ROW conforming substantially with the lines of such water course, and further width or construction, or both, as will be adequate for the purpose. Parallel streets or parkways may be required in connection therewith in accordance with any and all requirements of the GBPA. The use of a stormwater easement is highly discouraged.

Blocks. The length, width, and shape of blocks shall be determined with regard to:

A. Provision of adequate building sites suitable to the special need of the type of use contemplated.

B. Requirements of the Planning and Development Code as to lot size and dimensions.

C. Need for convenient access, circulation, control, and safety of street traffic.

D. Limitations and opportunities of topography.

Dimensions. Block length shall not exceed fifteen hundred (1,500) feet, or be less than four hundred (400) feet, unless a lesser or greater length is requested by the subdivider and is deemed advisable because of unusual conditions.

Crosswalks. In blocks nine hundred (900) feet or over in length, pedestrian crosswalks not less than ten (10) feet wide may be required to provide circulation or access to school, playground, shopping centre, transportation, and other community facilities.

Lots

(A) The lot depth, shape and orientation, and the minimum setback lines shall be appropriate for the location of the subdivision and of the type of development and use contemplated.

(B) Lot dimensions shall conform to area and use requirements of the Planning and Development Code.
(C) Residential lots where not served by a public water supply system shall contain not less than ten thousand (10,000) square feet in area, unless exception is granted by the GBPA.

(D) Each lot shall be provided by means of a public street with satisfactory access to an existing public street, or in the case of units within a townhouse site or cluster development, each lot shall be provided perpetual right of access by private street or roadway to an existing public street.

(E) Double frontage or through lots shall be avoided except where essential to provide separation of residential development from traffic arteries or to overcome specific disadvantages of topography or orientation. A decorative masonry wall, or in the sole discretion of GBPA, a combination of fence and landscaping that provides a satisfactory buffer shall be required along the rear property line, across which there shall be no right of vehicular access. This limited access shall be shown on the plat.

(F) In an effort to prevent graffiti vandalism, the following options shall be utilized for walls abutting zoned or dedicated ROWs:

(1) Wall with landscaping. The wall shall be setback two and one-half (2-1/2) feet from the ROW line and the resulting setback area shall contain a continuous extensively landscaped buffer that must be maintained in a good healthy condition by the property owner, or where applicable, by the condominium, homeowners, or similar association. The landscape buffer shall contain one or more of the following planting materials:

1. Shrubs. Shrubs shall be a minimum of three (3) feet in height when measured immediately after planting and shall be planted and maintained to form a continuous, unbroken, solid, visual screen within one (1) year after time of planting.

2. Hedges. Hedges shall be a minimum of three (3) feet in height when measured immediately after planting and shall be planted and maintained to form a continuous, unbroken, solid, visual screen within one (1) year after time of planting.

3. Vines. Climbing vines shall be a minimum of thirty-six (36) inches in height immediately after planting.
(2) Metal picket fence. Where a metal picket fence abutting a zoned or dedicated ROW is constructed in lieu of a decorative wall, landscaping shall not be required.

(3) Side lot lines shall, where possible, be substantially at right angles or radial to street lines.

404.11 Acceptance of Dedication. The dedication of public spaces shall not constitute an acceptance of the dedication by GBPA. The acceptance of the dedication shall be indicated on the plat.

405 MONUMENTS

(A) Permanent reference monuments shall be placed at each corner or change in direction on the boundary of the lands, and shall not be more than fourteen hundred (1,400) feet apart. Where such corners are in an inaccessible place, the permanent reference monuments shall be set on a nearby offset within the boundary of the lands, and such offset shall be so noted on the plat.

(B) Bearing, distance, and location shall be shown to all permanent reference monuments, and permanent reference monuments shall be shown on the plat by an appropriate symbol or designation.

(C) Material, size, and length of monuments shall conform to all Sections of this Code.

406 STREETS AND ROADS:

(A) Plans for streets or roads shall include alignment, topography, profile, curve data, cross-sections, and drainage.

(B) Design of streets and roads shall be in conformance with this Code.

(C) Specifications shall conform to the requirements set forth in this Code.

406.1 Curbs and Gutters. Where required, the type, shape, and size of curbs and gutters shall be shown and shall conform to the standards for sidewalks, curb and gutter in this Code.

406.2 Sidewalks. Where required, the location, type, width, and length of sidewalks shall be shown and shall conform to the standards for sidewalks outlined below.
(A) General:

(a) Sidewalks shall be constructed in areas designated by the GBPA and shall be of one course Portland Cement concrete and shall conform to the requirements of this Section.

(b) Concrete: All concrete used in the construction of any sidewalk shall conform to the requirements for concrete contained in this Code.

(B) Construction Methods:

(a) Preparation of Subgrade: In the area where the sidewalk slab is to be constructed, the existing ground shall be excavated or filled, as the case may require, to such an elevation that its finished surface will be uniformly parallel to, and four (4) or six (6) inches as the case may be, or to a thickness (greater) that the design engineer may determine.

The subgrade shall be properly shaped, rolled, and uniformly compacted to conform with the accepted cross-sections and grades.

All roots, vegetation, and other deleterious materials shall be removed from the sidewalk area. All fill shall be clean limerock or limerock and sand mixtures of quality acceptable to the design engineer. All fill shall be placed in layers not exceeding six (6) inches in compacted thickness, each layer uniformly compacted to a minimum field density of ninety (90) percent of the maximum density obtainable under AASHTO T 180-70.

Subgrade fill, unless retailed by existing curbs or walls, shall have a surface width equal to that of the slab plus one (1) foot on each side thereof. Side slopes on private property shall have a maximum one (1)-foot vertical to a four (4)-foot horizontal slope, unless otherwise specified by the design engineer. Slopes within the ROW shall conform with those required for the particular typical section.

Areas requiring excavation for the construction of the sidewalk slab shall have a finished bottom width sufficient for the slab and for the placement and removal of the forms employed. The top six (6) inches of subgrade in this case shall be uniformly compacted to a minimum field density of ninety (90) percent of the maximum density obtainable.
under AASHTO T 180-70, unless the excavation is into natural limerock.

After forms are set, and just prior to the pouring of the sidewalk slab, the subgrade shall be wetted and checked for elevation, and where found to be above or below the proper grade, it shall be regraded and recompacted. A movable templet approved by the design engineer shall be provided for checking the finished subgrade.

(b) Concrete: The concrete used for sidewalk construction shall be Class I concrete and shall attain a minimum compressive strength of three thousand (3,000) pounds per square inch (psi) in twenty-eight (28) days.

(c) Forms for Concrete: The forms for the concrete shall be of wood or metal, straight, free from warps or kinks, and of sufficient strength. They shall be staked securely enough to resist the pressure of the concrete without spring. When ready for the concrete to be deposited they shall not vary from the approved line and grade and shall be kept so until the concrete has set. Forms shall have a depth equal to the depth of the concrete being deposited against them.

The forms shall be set plumb, properly aligned, and with their bottom full and continuous contact with the subgrade. Forms shall be thoroughly cleaned and lightly oiled before concrete is placed against them.

(d) Placing and Finishing Concrete: Just prior to placing the concrete the subgrade shall be moistened. The concrete mixed to the proper consistency shall be placed in the forms and thoroughly tamped in place so that all honeycombs will be eliminated and sufficient mortar will be brought to the surface. After this the surface shall be brought to a smooth even finish by means of a wooden float. All faces adjacent to the forms shall be spaded so that after the forms are stripped the surface of the faces will be smooth, even, and free of honeycomb. All edges shall be tool rounded.

No concrete shall be placed until the subgrade is properly prepared and the forms are set and inspected.

The concrete shall be given a wooden float finish. The surface variation shall not be more than one-half (1/2) inch under a ten (10)-foot straightedge, parallel to the centreline,
or more than one-eighth (1/8) inch under a five (5)-foot straightedge transverse to the centreline. All edges and expansion joints of the sidewalk shall be carefully finished with an edging tool having a radius of one-half (1/2) inch. Finally, the sidewalk shall be broomed perpendicular to the forms to produce an even textured surface.

(e) Expansion and Contraction Joints for Concrete: One-half (1/2)-inch expansion joints shall be placed at intervals not exceeding sixty (60) feet. At intervals not greater than ten (10) feet or less than five (5) feet the concrete shall be scored for a depth equal to one-third the total depth of the concrete.

1. Type “A” (Open Joint): Type “A” joints shall be formed by staking or otherwise securing a metal bulkhead in place and placing concrete on both sides. The bulkhead shall be one-half (1/2)-inch thick and equal in depth to the sidewalk. After the concrete has set sufficiently to preserve the shape of the joint, the bulkhead shall be removed. Then after the sidewalk has been finished over the joint, the slot shall be edged with a finishing tool having a one-half (1/2)-inch radius. After the concrete has hardened and become dry, the open joint shall be thoroughly cleaned of all debris and loose material for the full section of the sidewalk.

2. Type “B” (Contraction Joint): Type “B” joints shall be formed with a one-eighth (1/8) inch thick metal bulkhead that shall be placed to a depth of one and one-half (1-1/2) inches. After the concrete has set sufficiently to preserve the shape of the joint, the bulkhead shall be removed. Then after the sidewalk has been finished over the joint, it shall be edged with a finishing tool having a one-half (1/2)-inch radius.

Type “B” joint may also be formed by sawing the concrete. A slot approximately three-sixteenths (3/16) inch wide and not less than one and one-half (1-1/2) inch deep shall be cut with a concrete saw after the concrete has set, and within the following periods of time:

- Joints at not more than five (5)-foot intervals –
within twelve (12) hours after finishing.

– Remaining joints – within forty-eight (48) hours after finishing.

3. Type ―C‖ (Expansion Joint): Type ―C‖ joints shall be constructed by securing a one-half (1/2) inch premolded expansion joint material, equal in depth to the concrete, and placing the concrete directly against it. The joint material shall be secured during concrete placement so that it is held vertical and in a straight line. The premolded expansion joint material shall meet the requirements of AASHTO Specification M153 (ASTM D 1752).

(f) Curing Concrete. Curing the concrete shall be as specified in Section 407.8 (J), with the following modifications:

1. The impervious coating may be either clear or white pigmented membrane curing compound.

2. The impervious coating may be used after the preliminary curing period with other materials or it may be used initially and for the entire seventy-two (72)-hour curing period.

3. The impervious coating shall be applied by the hand-operated spray equipment with nozzles capable of thoroughly atomizing the curing compound so as not to mar the surface and, when necessary, equipped with an appropriate wind guard to assure uniform application.

4. The compound shall be applied in a single coat, continuous operation at a uniform coverage of at least one (1) gallon per each two hundred (200) square feet.

5. Surfaces covered by membrane curing compound shall remain undisturbed for a period of seventy-two (72) hours after beginning of initial curing.

(g) Backfilling: Backfill shall be of suitable selected material, and shall be placed and tamped in layers of not over six
(6) inches until firm and solid. Backfilling shall follow immediately after the concrete forms have been removed.

(h) Reinforcement. Where the plans call for steel fabric reinforcement to be placed in the sidewalk, such reinforcement shall meet the requirements of AASHTO Specification M55.

(i) Depth of Sidewalk. Sidewalk in residential areas shall be a minimum of four (4) inches in depth except where the sidewalk is part of a driveway or a tee-turnaround, in which case the depth shall be increased to a minimum of six (6) inches.

In all other areas, such as commercial or industrial where the sidewalk is subject to vehicle loading, the sidewalk shall have a minimum thickness of six (6) inches that shall extend at least five (5) feet each side of the area designated for vehicle crossing.

(j) Protection of Newly Finished Surfaces. The contractor shall have available at the site an adequate quantity of suitable covering material to protect the surface of concrete that has hardened from damage by rain.

Forms shall not be removed from freshly placed concrete until it has set for at least twelve (12) hours.

(k) Private Property Repairs. All structures, living trees, shrubs, or grassed areas on private property, removed for the convenience of the contractor or damaged in any way while work is in progress, shall be repaired or replaced to its original condition in a manner acceptable to the design engineer.

All concrete entrance walks and driveways, as required, shall be extended or cut back to an existing joint or to a sawed joint provided by the contractor. Slopes for the altered walks and driveways shall not be greater than one vertical to eight horizontal. In place of sloping walks, steps shall be constructed when requested by property owners. Risers shall not exceed seven (7) inches and treads shall not be less than twelve (12) inches wide. Forms shall be set and concrete shall be replaced to match existing concrete work both in surface texture and color as closely as possible.
Each property owner is responsible for any walls, fences, hedges, trees, mail boxes, or other improvements that encroach upon the ROW, and shall remove or relocate the same at his expense.

The contractor shall cooperate with the owner in an effort to facilitate removal prior to construction.

(l) Clean-Up. Pavements, driveways, swales, and other areas affected by this work shall be swept or otherwise cleaned and restored to its original condition as approved by the design engineer.

(m) Inspection. All work pursuant to this Section will be subject to inspection during its progress.

406.3 Streets and Roads:

(A) Limerock Base:

A Material:

1 Limerock base shall be constructed of local materials from an approved source and shall have a compacted thickness of not less than six (6) inches, unless otherwise called for on the approved plans, and in conformity with the line, grades, and typical cross-sections as shown on the approved plans.

2 Limerock for base construction shall contain no roots, leaves, or other organic matter and shall meet the following chemical requirements:

- Carbonates of Calcium and Magnesium: Minimum seventy-five (75) percent.
- Oxides of Iron and Aluminum: Maximum two (2) percent.
- Any other constituents shall be silica or inert material.

B Transportation: Transportation of limerock shall be to a point where it is to be used over rock previously placed and dumped on end of preceding spread. No hauling over or dumping on the prepared subgrade shall be permitted.
C Spreading: Spreading of limerock shall be uniform and by hand, bulldozer, grader, or other approved equipment during dumping and spreading. The rock shall be thoroughly wetted and any aggregated areas of fine or coarse rock shall be removed and replaced with well-graded rock.

D Compaction:

1 Compaction and finishing shall commence following the spreading operation. The rock shall be rolled with water being added as required until the entire depth of the base is compacted into a dense unyielding mass.

2 Compaction effort shall continue until material is compacted at proper moisture content to a density of not less than ninety-five (95) percent of the maximum density obtainable under AASHTO T-180 method (modified).

3 During final compacting operations, if blading of any area is necessary to obtain the true grade and cross-section, compaction operations for this area shall be completed prior to any final density tests.

4 If checks or cracks appear in the base (either before or after priming) and before the surface course is laid, they shall be removed at the discretion of the GBPA by rescarifying, reshaping, or adding material as needed to complete recompaction.

E Equipment:

1 All equipment used by the subdivider shall be in good, safe, operable condition and shall meet with the approval of the GBPA. The equipment shall be adequate for the particular work it is performing.

2 All inadequate, worn out, inoperable, or unsafe equipment shall be removed from the job at the direction of the GBPA.

F Shape:

1 Testing base course shall be done before priming using a fifteen (15)-foot straightedge laid parallel
with the centreline and a template cut to the true cross-section laid perpendicular to the centreline.

2 All irregularities greater than one-fourth (1/4) inch shall be corrected by rescarifying to a depth of at least four (4) inches and then removing or adding rock as necessary after which the entire area shall be watered, rolled, and brought to satisfactory compaction.

G Alternate Bases: Alternate types of base courses such as bituminous stabilized base, shell base, or other bases shall be used only by special approval of the GBPA.

(B) Bituminous Prime Coat:

A Specifications: Bituminous material for the prime coat shall conform to United States Federal Specifications for the following grades of asphalt. Prime Coat RC-1 or RC-2

B Rate of Application: The rate of application of the bituminous material for the prime coat shall be between one-tenth (0.10) and three-tenths (0.30) gallons per square yard. The exact rate to be used shall be ordered by the GBPA.

C Equipment:

1 The equipment used by the subdivider shall include a self powered pressure bituminous distributor and equipment for heating bituminous material, and shall be so designed, equipped, maintained, and operated, that bituminous material at even heat may be applied uniformly on variable widths of surface under a minimum pressure of forty (40) psi.

2 Distributor equipment shall include a tachometer, pressure gauges, volume measuring devices, and thermometer for reading temperatures of tank contents. Equipment for heating bituminous material shall consist of a retort or steam coils so designed that steam will not be introduced into the matter.

D Temperature of Application: The temperature of application of the bituminous material shall be as contained in Table 400.1 or as directed by the GBPA.
### TABLE 400.1

**TEMPERATURES OF APPLICATION OF BITUMINOUS MATERIALS**

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<th>TEMPERATURE OF APPLICATION</th>
<th>Spraying °F</th>
<th>Mixing °F</th>
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**TABLE 400.1**

TEMPERATURES OF APPLICATION OF BITUMINOUS MATERIALS

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</table>

**E Application:**

1. The prime coat shall not be applied until the base has been properly prepared to receive it. Immediately before applying the prime coat, the full width of surface to be primed shall be "hard bladed" and then swept with a power broom supplemented with hand brooms. Care shall be taken to remove all loose dust, dirt, clay, and other objectionable material.

2. If deemed necessary, the GBPA may require that the base be lightly sprinkled with water immediately in advance of the application of the prime coat.

**F Protection:**

1. Following the application, the primed surface shall be allowed to dry for a period of not less than forty-eight (48) hours, without being disturbed, or for such additional period of time as may be necessary to permit the drying of the primer until it will not be picked up by traffic equipment. The surface shall then be maintained by the subdivider until the surfacing has been placed. Suitable precautions shall be taken by the subdivider to protect the primed surface against damage during this interval.

2. Surplus prime coat material that collects in depressions shall be removed by mopping. The use of sand to blot up excess bituminous material shall be used only when authorized by the GBPA.
Double Bituminous Surface Treatment:

Bituminous Material:

1. Bituminous material for this section shall conform to United States Federal Specification for the following grades of asphalt. First Coat RC-3 or RC-4: or RS or MS Alternate Seal Coat RC-3 or RC-4: or RS or MS Alternate

2. Rates of application shall be as follows or as directed by the GBPA.

   First coat two-tenths (0.2) to thirty-five hundredths (0.35) gallon per square yard. Seal coat forty-five hundredths (0.45) to sixty-five hundredths (0.65) gallon per square yard.

Aggregates:

1. Wearing surface, aggregate shall be crushed stone consisting or particles of washed, clean, tough, durable rock fragments and free of any dust, organic, or deleterious material.

   Table 400.2
   Gradiation Requirements

<table>
<thead>
<tr>
<th>Sieve Designation</th>
<th>Percent by Weight Retained on Square Mesh Sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First Coat Aim.</td>
</tr>
<tr>
<td>1½ inch</td>
<td>0</td>
</tr>
<tr>
<td>1 inch</td>
<td>0</td>
</tr>
<tr>
<td>¾ inch</td>
<td>0-5</td>
</tr>
<tr>
<td>½ inch</td>
<td>0-15</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>85-95</td>
</tr>
<tr>
<td>No. 4 inch</td>
<td>95-100</td>
</tr>
</tbody>
</table>

2. Rates of application shall be as follows or as directed by the GBPA.

   First coat 25-40 pounds per square yard = .30 to .50 cubic feet per square yard. Seal coat 20-35 pounds per square yard = .25 to .40 cubic feet per square yard.

Weather and Temperature Limitations: No bituminous material shall be applied when the temperature of the air is below sixty (60) degrees Farenheit and falling or if the
wind is in excess of twenty (20) mph, or during foggy or rainy weather, or in the opinion of the GBPA, other unfavorable conditions exist that would be detrimental to the work.

D Construction Methods:

1 Preparation: After the surface to be treated has been cleaned to the satisfaction of the GBPA, the bituminous material shall be spread uniformly over the dry surface by means of pressure distributor. Excessive deposits of bituminous material caused by stopping or starting the distributing machine, leakage or other means shall be immediately removed.

2 Prime Coat: The prime coat shall be applied in accordance with Section 406.3 (B) E. After the prime coat has thoroughly set up, the second application of bituminous material shall be applied at the rate specified.

3 Spreading: Immediately following the second application of bitumen the coarse aggregate shall be uniformly spread at the rate specified by means of spreader boxes or approved mechanical equipment, or from moving vehicles equipped to distribute the material in a uniform layer.

4 Brooming: As soon as possible after the aggregate has been spread it shall be broomed with a light drag broom to secure a uniform distribution of aggregate. Additional aggregate shall be placed by hand and hand-broomed on any areas not properly covered.

5 Rolling:

(i) The uniformly spread aggregate shall then be rolled with a steel-tired roller, (or combination steel and rubber-tired) weighing not less than five (5) tons, as approved by the GBPA, and a traffic type roller having not less than nine smooth tread low pressure tires capable of carrying a gross load of eight (8) tons as approved by the GBPA.
(ii) Rolling shall progress gradually from the sides to the centre parallel with the centreline of the road and lapping uniformly each preceding track by one-half the width of the track, and shall continue until the coarse aggregate is thoroughly keyed into the bitumen.

(iii) Prior to applying the bitumen for the seal coat all loose and excess aggregate shall be removed from the road surface.

6 Seal Coat: The seal coat of bitumen and aggregate shall be applied at the rate specified and in the manner described above for the second application.

7 Protection: After application of bituminous material, traffic shall not be allowed to use the road until the cover material has been placed and thoroughly tolled. If practicable, traffic shall be kept off the finished surface for forty-eight (48) hours. Where this is impracticable, traffic shall be restricted to a maximum speed of fifteen (15) mph during this forty-eight (48)-hour period. For this purpose the contractor shall furnish and maintain suitable barricades, signs, and lights.

(D) One Course Asphaltic Concrete: (Plant Mixed)

A Bituminous Material:

1 Bituminous material for this section shall conform to United States Federal specification for the following grades of asphalt:

(i) Liquid asphalt for the tack coat shall be grade RD-2.

(ii) Asphalt cement to be used in the asphaltic concrete shall be uniform in character, free from water, and shall not foam when heated to three hundred fifty (350) degrees Fahrenheit and shall meet the following requirements for penetration.

Penetration at 77°F, 100 grams, 5 seconds - 100 to 200
2 No mineral matter other than that naturally contained in the asphalt shall be present.

B Aggregates:

1 Aggregate shall consist of fine gravel and sand, particles of washed, clean, tough, durable rock fragments or other similar granular materials. The portion of the material retained on a No. 4 sieve shall be known as coarse aggregate and that portion passing a No. 4 sieve shall be known as filler.

2 The materials shall be graded and proportioned as follows in Table 400.3:

<table>
<thead>
<tr>
<th>Sieve Designation</th>
<th>Percent by Weight Passim</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>100</td>
</tr>
<tr>
<td>3/4-inch</td>
<td>85-95</td>
</tr>
<tr>
<td>No. 4</td>
<td>60-95</td>
</tr>
<tr>
<td>No. 10</td>
<td>45-80</td>
</tr>
<tr>
<td>No. 200</td>
<td>5-15</td>
</tr>
</tbody>
</table>

C Construction Methods:

1 Applying Tack Coat: Immediately before placing the bituminous mixture the existing surface shall be cleaned of loose or deleterious material by sweeping with a power broom or hand broom. The surface shall be thoroughly dry before applying the tack coat. When the existing surface has been put in proper condition, a tack coat shall be applied to the surface at the rate specified by a power distributor of approved type, having a pressure of not less than forty (40) psi. The bituminous mixture shall be spread and finished immediately after the tack coat has been applied.

2 Spreading and Finishing: Where cement concrete or masonry edging is not specified on the accepted plans, suitable side forms of wood or steel shall be firmly fastened in place and shall be true to line and grade as shown on the accepted plans. These forms shall remain in place until initial compaction has been obtained.
(i) Temperature: The bituminous mixture shall be delivered on the job at a temperature of not less than two hundred fifty (250) degrees Fahrenheit.

(ii) Paver: Whenever practical the mixture shall be spread by means of an approved mechanical self-powered paver, capable of spreading the mixture true to the line and grade and crown as shown on the accepted plans and cross-sections.

(iii) Hand Spreading: When the mixture is to be spread by hand it shall be deposited outside of the area on which it is to be spread. Immediately thereafter it shall be distributed into place by means of hot shovels and spread with hot rakes in a loose layer of uniform density and correct depth. Loads shall not be dumped and distributed any faster than they can be properly handled by the shovellers and rakers. The raking shall be carefully and skillfully done in such manner that after the first passage of the roller over the raked mixture a minimum amount of back patching will be required.

(iv) Continuity: Placing of the mixture shall be as continuous as possible and the roller shall pass over the unprotected edge of the fresh laid mixture only when the laying of the course is to be discontinued for such length of time as to permit the mixture to become chilled.

(v) Joints: Longitudinal and transverse joints shall be well bonded and sealed. If necessary to obtain this result, the joints shall be cut back to the full depth of the previously laid course, painted with hot asphalt and heated. Before placing the mixture against them, all contact surfaces of curbs, gutters, headers, manholes, etc., shall be painted with a thin uniform coating of hot asphalt cement or asphalt cement dissolved in naphtha.
(vi) Compaction: After spreading, the mixture shall be thoroughly compacted by an approved type power driven roller, weighing not less than five (5) tons, as soon after being spread as it will bear the roller without undue displacement. Rolling shall start longitudinally at the sides and proceed towards the centre of the pavement overlapping on successive trips by at least one-half the width of the previous track. The pavement shall then be rolled diagonally in two directions with an approved type roller, weighing not less than eight (8) tons, the second diagonal rolling shall cross the lines of the first. Along curbs, headers, manholes, and similar structures and at all places not accessible to the roller, thorough compaction must be secured by means of hot tampers and at all contacts of this character the joints between these structures and the surface mixture must be effectively sealed.

(vii) Weather and Temperature Limitations: No asphalt material shall be laid when the temperature of the air is sixty (60) degrees Farenheit and falling or if the wind is in excess of fifteen (15) mph or during foggy or rainy weather, or in the opinion of the GBPA other unfavorable conditions exist that would be detrimental to the work.

(E) Sand and Seal:

A Description: Sand seal coat shall consist of a single application of bituminous material covered by a single application of sand cover material on an existing base or pavement in accordance with the lines, grades, and cross-sections shown on the construction plans.

B Bituminous Material: Bituminous material used for this Section shall conform to United States Federal Specification for the following grades of asphalt:

1 Semisolid asphalt: AASHO M-20

2 Emulsified asphalt: Grade RS-2
3 Cut back asphalt: Grade RC-1 S or RC-3

The particular bituminous material to be used shall be shown on the construction plans.

C Cover Material: Cover material shall be clean sand. The sand shall be free from clay, silt, sticks, trash, roots, vegetation, and other organic matter and shall be approved by GBPA or its designated agent before use. Clean local sand may be used.

D Proportions: Unless or otherwise shown on the plans the proportions of bitumen to cover material shall be approximately fifteen hundredths (0.15) gallons of asphalt and fifteen hundredths (0.15) cubic feet of cover material (loose measure) per square yard. The exact quantities shall be determined by the GBPA.

E Construction Methods:

1 Equipment: All equipment necessary for the proper construction of this work shall be on the site of the work in first-class condition and shall have been approved by the GBPA before construction is started.

2 Pressure Distributor: The self-powered pressure distributor shall meet all the requirements of Section 406.3 (B) C of this Code.

3 Rollers: For this Section the rollers shall be three (3) ton to five (5) ton steel-tired or a combination steel and rubber-tired roller.

4 Trucks and Spreaders: Sufficient trucks and other necessary spreading equipment shall be on the site of the work to ensure continuous spreading of the aggregate on the uncovered bituminous material. Spreading equipment shall be capable of producing a smooth, uniform distribution of the cover material. Spreaders shall be attached to the trucks. If spreaders are to be transferred from truck to truck as spreading is done, the attaching device shall be such that the transfer can be easily and quickly made.

5 Preparation of Surface: The surface to be covered shall be swept clean and free from sand, dirt, dust,
and other deleterious matter by means of mechanical rotary sweepers, hand brooms, and approved mechanical blowers, and shall be free from moisture. When a prime coat has previously been applied to the surface, no bituminous material shall be applied until the prime coat has become thoroughly cured as determined by the GBPA.

Weather Limitations: No bituminous material shall be applied on a falling thermometer or when the temperature is below sixty (60) degrees Farenheit, or if the wind is in excess of twenty (20) mph, or during foggy or rainy weather or in the opinion of GBPA or its designated Agent, other unfavourable conditions exist that would be detrimental to the work.

Application of Bituminous Material:

(i) After the surface to be treated has been cleaned to the satisfaction of the GBPA, the bituminous material shall be sprayed uniformly over the dry surface by means of a pressure distributor.

(ii) The machine used for applying the bituminous material all maintain a pressure of not less than twenty (20) nor more than seventy-five (75) psi.

(iii) The bituminous material used shall be applied at the temperatures specified in Table 400.1 or as directed by the GBPA.

(iv) Special precautions shall be observed to the end that an even and uniform distribution of bituminous material shall be obtained and the distributing machine shall be so adjusted and operated, as to distribute evenly at all times, the class of material being applied. Excessive deposits of bituminous material upon the road surface caused by stopping or starting the distributing machine, by leakage or otherwise, shall be immediately removed.

(iv) The area to be covered by any one application of bituminous material shall be not greater, in the opinion of the GBPA, than can be covered with the aggregate
without interruption due to limitations of hauling and spreading equipment or any other cause.

8 Spreading Cover Material:

(i) Immediately following the application of bituminous material, the cover material shall be distributed uniformly over the bituminous surface one, two, or three courses as indicated on the plans or in the contract. Spreading shall be done directly from trucks by means of approved mechanical spreaders. Only drivers experienced in this type of work shall be used in driving the spreader trucks. Trucks or spreaders shall not be driven on the uncovered bituminous material.

(ii) Immediately after each application of cover material has been spread, brooming by experienced and skilled workmen shall be done to secure a uniform distribution that will ensure a smooth surface. Additional aggregate shall be placed by hand on any areas not properly covered. The surface shall then be dragged with a light drag broom or other dragging equipment approved by the GBPA. The dragging equipment shall be such as will not disturb the embedded aggregate. This operation shall be supplemented by additional hand brooming until a smooth and even surface is obtained. The dragging and brooming shall be repeated in conjunction with the rolling as often as in the opinion of the GBPA is necessary to ensure a uniform surface. The dragging requirements shall apply to each application of cover material.

9 Rolling and Curing:

(i) Immediately after spreading and dragging of cover material, the entire surface shall be rolled. The rolling shall in all cases begin within thirty (30) minutes after the spreading of cover material.
(ii) Rolling shall begin at the edges and progress to the centre of the surface, uniformly lapping each preceding track and thoroughly covering the entire surface.

(iii) During rolling additional dragging and hand brooming shall be done as specified in Section 406.3 (C) D.

(iv) The cover material shall be rolled with a steel-tired roller and rolling shall be repeated as often as in the opinion of the GBPA is necessary to ensure thorough keying of the cover material into the bituminous material and to secure a uniformly closed surface.

10 Surface Requirements: The finished surface shall be uniform and shall conform to the lines, grades, and typical cross-section shown on the plans. Such portions of the complete surface that are defective, not properly finished, have fat spots, or do not comply in all respects with the requirements of these specifications, shall be replaced with a satisfactory surface laid in accordance with these specifications. In this case no allowance shall be made for the replaced surface.

11 Protection: After the application of bituminous material, traffic shall not be allowed to use the road until the cover material has been placed and thoroughly rolled. If practicable, traffic shall be kept off the finished surface for forty-eight (48) hours. Where it is impracticable to keep traffic off the finished surface for a period of forty-eight (48) hours after the surface is finished, traffic shall be restricted to a maximum speed of fifteen (15) mph during this forty-eight (48)-hour period. For this purpose the subdivider shall furnish and maintain suitable barricades, warning signs, and lights, and shall provide watchmen and vehicles to lead traffic through the restricted section of the roadway.

(F) Slurry Seal Coat:

A Bituminous Material:
Bituminous material for this Section shall conform to United States Federal Specification for the following grades of asphalt: SS-S-674b - Asphalt Emulsion.

SS-Z shall be used with a penetration range of 40,100 and viscosity range of 20 to 50.

B Aggregates:

1 Mineral aggregate shall be commercially produced limestone fines, clean sand, ceramic slag, other approved materials, or a blend of the above materials meeting the following limits. The combined mineral aggregate shall have a percent of wear loss not to exceed thirty-five (35) percent. The plasticity index shall not exceed 5 and the sand equivalent shall be forty-five (45) millimeters (mm). The combined aggregate will conform to the following grading:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>#1 Percent Passing</th>
<th>#2 Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8 inch</td>
<td>100</td>
<td>95-100</td>
</tr>
<tr>
<td>¼ inch</td>
<td>100</td>
<td>80-95</td>
</tr>
<tr>
<td>10 mesh</td>
<td>80-95</td>
<td>65-85</td>
</tr>
<tr>
<td>40 mesh</td>
<td>35-60</td>
<td>35-60</td>
</tr>
<tr>
<td>80 mesh</td>
<td>12-30</td>
<td>15-35</td>
</tr>
<tr>
<td>200 mesh</td>
<td>3-12</td>
<td>5-15</td>
</tr>
</tbody>
</table>

The #1 aggregate shall be used when application rate is below seven (7) pounds P.S.Y. and the #2 aggregate shall be used when the application rate is above seven (7) pounds P.S.Y. or as directed by the GBPA. When a blend is used, sand shall not exceed fifty (50) percent of total combined aggregate.
3 Water shall be potable and free from harmful soluble salts.

C Composition of Materials:

1 Asphalt emulsion shall be blended with the pewter #1 aggregate in the proportion of nine (9) to twelve (12) percent (residual asphalt content) by dry aggregate weight.

2 The asphalt emulsion shall be blended with the pewter #2 aggregate in the proportion of eight (8) to eleven (11) percent (residual asphalt content) by dry aggregate weight. Only the amount of water necessary to obtain a fluid and homogeneous mixture shall be added. The water may be varied slightly in the mixture for various surface conditions.

3 The subdivider shall make trial batches at their expense to determine the final blend of material aggregate and asphalitic binder to be used for most adequate results and approval of the GBPA.

D Equipment: All equipment, tools, and machines used in the performance of this work shall be maintained in satisfactory working condition.

1 Mixer:

(i) The slurry seal coat mixing machine shall be a continuous flow mixing unit and be capable to accurately deliver and proportion aggregate, asphalt emulsion, and water to a revolving spiraled multi-blade mixer tank and discharge the thoroughly mixed product on a continuous basis in a minimum amount of time.

(ii) The mixing machine shall be equipped with a water pressure system and fog type spray bar adequate for complete fogging of surface preceding spreading
equipment with a maximum application of fifty hundredths (.05) gallon P.S.Y. A calibrated control for aggregate and asphalt shall be provided capable of accurate proportioning of materials.

(iii) The machine shall be capable of a minimum speed of sixty (60) feet per minute (fpm) and shall not be allowed to exceed one hundred eighty (180) fpm while in operation. Sufficient machine storage capacity to properly mix and apply a minimum of five (5) tons of slurry shall be provided.

2 Spreading Equipment: Attached to the mixer machine shall be a mechanical type squeegee distributor equipped with flexible material in contact with the surface to prevent loss of slurry from distributor. It shall be maintained so as to prevent loss of slurry on varying grades and crown by adjustments to assure uniform spread and depth. There shall be a steering device and a flexible strike-off.

3 Auxiliary Equipment: Hand squeegees, shovels, and hand equipment shall be provided as necessary to perform work.

E Preparation of Surface: Immediately prior to applying slurry seal, the surface shall be cleaned of all loose material, silt spots, vegetation, and other objectionable material.

F Application of Slurry Seal Coat:

1 The surface shall be fogged directly preceding the drag distributor. The slurry mix shall be of the desired consistency when deposited on the surface no additional elements added.

2 Total time of mixing shall not exceed four (4) minutes. A maximum amount of slurry
shall be carried in distributor and maximum allowable speed shall be one hundred eighty (180) fpm.

3 A minimum of one-sixteenth (1/16) inch shall be applied when using aggregate #1. When using aggregate #2, a minimum of one-eighth (1/8) inch thickness shall be applied.

4 #1 aggregate shall be used for crack sealing and minor surface voids. #2 aggregate shall be used for moderate to severe surface conditions.

5 Determination of aggregate to be used shall be specified as to texture of surface to be covered by the GBPA.

6 Approved squeegees shall be used to spread slurry in non-accessible areas of slurry mixer.

7 Following the application of the slurry seal, traffic of all types shall be kept off the new surface for a period of four (4) hours.

G Alternative Surfaces:

1 General. Any base and surface in keeping with good engineering practice will be considered by the GBPA.

406.6 Required Surface: The surfacing and paving shall be suitable for the expected traffic and in harmony with similar improvements in the surrounding areas. Flexible pavement shall be designed to meet the minimum structural numbers (SNs) required in this Code. All road pavement, shoulders, drainage improvements and structures, curbs, turnarounds, and sidewalks shall conform to all construction standards and specifications adopted by GBPA.

406.7 Underground Utilities: Required subdivision roadways shall be constructed following installation of all underground utilities by the responsible party.

406.8 Flexible Pavement: Minimum standards for flexible pavement in a subdivision are established in Table 400.5.
### Table 400.5
Minimum Standards for Flexible Pavement

<table>
<thead>
<tr>
<th>Street Classification</th>
<th>Minimum SN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial Street and Industrial Driveways</td>
<td>3.0</td>
</tr>
<tr>
<td>Local and Collector Streets</td>
<td>2.5</td>
</tr>
<tr>
<td>Parking Areas</td>
<td>1.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Street Classification</th>
<th>Minimum Surface Course Thickness (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial and Industrial Streets</td>
<td>1.75, Type S-I</td>
</tr>
<tr>
<td>Collector Street</td>
<td>1.5</td>
</tr>
<tr>
<td>Local Street</td>
<td>1.5, Type S-III</td>
</tr>
<tr>
<td>Parking Areas</td>
<td>1.0, Type S-III</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Street Classification</th>
<th>Minimum Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum base shall be at least 6 inches compacted thickness to 98% AASHTO T-180 of limerock, cemented coquina shell, crushed concrete, or 8 inches of approved shellrock.</td>
<td>Minimum base shall be at least 6 inches compacted thickness to 98%, extending 3 feet from pavement AASHTO T-180 of limerock, cemented coquina shell, crushed concrete, or 8 inches of approved shellrock.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Street Classification</th>
<th>Minimum Subgrade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial Streets, Industrial Driveways, and Collector and Local Streets</td>
<td>Subgrade shall be a minimum of 12 inches compacted thicknesses to 98% of AASHTO T-180 and shall have a minimum 50 PSI Florida bearing value (FBV).</td>
</tr>
<tr>
<td>Parking Areas</td>
<td>Same compaction as required for arterial and related streets (see above). Minimum 35 PSI FBV. No credit toward SN until at least 50 PSI is obtained</td>
</tr>
</tbody>
</table>

406.9 Maximum and Minimum Grade: The grades on all streets in a subdivision shall comply with the standards listed below.

(A) Maximum grade. Maximum grade shall not exceed eight (8) percent.

(B) Minimum grade. Minimum grade shall be at least three-tenths (0.30) percent.

406.10 Vertical Alignment

(A) Vertical curves required. Vertical curves of subdivision streets shall be required where the algebraic difference in intersecting grades equals or exceeds values listed in the table below.
Table 400.6
Vertical Curves

<table>
<thead>
<tr>
<th>Street Classification</th>
<th>Algebraic Difference (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector Street</td>
<td>0.8%</td>
</tr>
<tr>
<td>Local Street</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

(B) Minimum Length. All vertical curves shall be of sufficient length to provide a safe stopping sight distance compatible to the design speed of the roadway. Minimum length of all vertical curves shall be one hundred (100) feet.

(C) Minimum Slopes. Minimum cross slopes or super-elevation rates of two (2) percent feet per foot shall be utilized for the design of all roadways.

406.11 Intersections

(A) General Standards. Subdivision streets shall be laid out so as to intersect as nearly as possible at right angles. A proposed intersection of two new streets at an angle of less than seventy-five (75) degrees shall not be acceptable unless specifically approved by the GBPA Engineer. An oblique street should be curved approaching an intersection and should be approximately at right angles for at least one hundred (100) feet therefrom. Not more than two streets shall intersect at one point.

(B) New Intersections. Proposed new intersections along one side of an existing street shall, wherever practicable, coincide with any existing intersections on the opposite side of such street. Street intersections with centreline separations of less than one hundred fifty (150) feet shall not be permitted. Intersection of collector and arterial streets shall be at least eight hundred (800) feet apart, centreline to centreline, wherever practicable.

(C) Minimum Curb Cut Radius. Minimum curb radius at the intersection of two local streets shall be at least thirty (30) feet, and minimum curb radius at an intersection involving a collector street or industrial street shall be at least forty (40) feet.

(D) Visibility. Visibility at a street intersection cannot be limited by vegetation, berms, earth banks, or similar obstructions so as to create a traffic hazard; safe-sight triangles shall always be provided.
406.12 Bridges: In a subdivision, bridges of primary benefit to the property owner, as determined by GBPA, shall be constructed at the full expense of the owner without reimbursement from GBPA. A contribution by GBPA, if any, for the construction of bridges not of primary benefit to the applicant shall be established by an agreement between GBPA and property owner.

406.13 Utilities: All new, reconstructed, or relocated utilities installed within a subdivision or any development, including but not limited to electric, telephone, and cable television, shall be placed underground at the discretion of the GBPA. Special permission must be granted for overhead installations.

406.14 Construction Standards – See Planning and Development Code

407 BRIDGES AND CULVERTS - See Planning and Development Code

407.1 Preliminary Approval of Plans

(A) Submitting Proposal. It shall be the responsibility of the design engineer to notify GPBA by letter of a proposed plan to construct a waterway structure. The letter should be addressed to GBPA and shall contain the following information:

(1) A location sketch showing existing and proposed ROW in sufficient detail to adequately relate the structure to existing topography.

(2) Proposed use of structure (vehicular traffic, foot traffic, utility crossing, etc.)

(3) The name of the person or persons that GBPA may contact if additional information is required. For example, name of the owner or developer, their address and telephone number; and name of the design engineer, and their address and telephone number.

(4) A brief description of the proposed structure, the approximate span length and the existing and proposed channel section where applicable.

(5) Any other information or details that may be peculiar to the specific situation in order that the review may be complete.

(B) Letter of Approval. Upon receipt of this letter, GBPA will review the information contained therein and will notify the design
engineer by letter of the requirements for the particular structure. The notification will include:

(1) Statement as to whether the structure shall be a bridge or culvert.

(2) Design water elevation, vertical, and horizontal clearances.

(3) Waterway section including side slopes and minimum berm widths.

(4) Other permit requirements. If the letter from GBPA states no objections to the structure, then the letter of reply may be considered by the design engineer as preliminary approval, and may proceed with the design in accordance with the information contained in this Section. Final approval of the construction plans by GBPA is required prior to the issuance of a permit for construction. No work shall proceed on the structure without a permit.

407.3 Structural Design Criteria. See Planning and Development Code.


407.5 Final Approval of Construction Plans – See Planning and Development Code.

407.6 Construction Permit

A permit for construction will be issued provided:

(1) Two sets of construction plans, identical to the approved plans, are presented.

(2) The required permit fee is paid and for all structures that will be maintained by GBPA.

(3) A performance bond has been provided, either under a subdivision agreement or a special agreement with GBPA, in the amount of one hundred ten (110) percent of the estimated cost of the structure.

(4) Certification is presented to the effect that a qualified engineer licensed by the GBPA has been retained to provide engineering supervision throughout the construction period.
407.7 Information Required During Construction. See Planning and Development Code.

407.8 Information Required before Final Acceptance by GBPA. The design engineer shall furnish GBPA with the following minimum information when the structure is complete and prior to final acceptance by GBPA.

(1) A letter from the design engineer certifying that the structure has been built in accordance with the approved plans and specifications.

(2) One complete set of “as-built” drawings.

407.9 Utility Attachment to GBPA Bridges – See Planning and Development Code.

408 DRAINAGE

408.1 General. The work specified in this Section of the excavation, construction, backfilling, and finishing of all drainage structures, pipes, culverts, swales, drains, and similar structures.

(A) Excavation:

(1) General: The contractor shall perform all excavation of every description and of whatever substances encountered to the depths indicated on the Plans and Standard Details, or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and prevent slides or cave-ins. Unless otherwise indicated, excavation shall be by open cut except where tunneling or jacking is permitted or required to allow continuous vehicle access or to prevent cutting a newly placed pavement.

(2) Pipe Trench Excavation: Pipe trenches shall be of necessary width for the proper laying of the pipe and the banks shall be as nearly vertical as practicable. The bottom of the pipe trench when in hard rock shall be graded to a minimum of four (4) inches below the outside bottom of the pipe and refilled to bedding level with sand or other suitable bedding material to provide uniform bearing and support for each section of the pipe at every point along the entire length, except for the portions of the pipe sections where it is necessary to excavate for bell holes and for the proper sealing of pipe joints. Bell holes and depressions for
joints shall be dug after the gravel bed has been placed. In order that the pipe rest upon the gravel for as nearly its full length as practicable, the holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint. When materials in the bottom of the trench are not suitable for placement of pipe, the contractor shall excavate and remove such unsuitable material to the width and depth ordered by the GBPA Engineer. The trench shall then be backfilled with suitable material and compacted or thoroughly tamped in four (4)-inch layers to provide a uniform and continuous bearing, and should match approximately the density of the soil in which the trench was cut.

(3) Pipe Trench Width: The maximum clear width of trench measured at the spring line, without under-cutting the banks, shall be in accordance with the Table 400.8.

Table 400.8
Maximum Clear Width of Trench at the Springline

<table>
<thead>
<tr>
<th>SIZE OF PIPE (inches)</th>
<th>WIDTH OF TRENCH (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>24</td>
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<tr>
<td>8</td>
<td>36</td>
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<td>66</td>
<td>109</td>
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<tr>
<td>72</td>
<td>112</td>
</tr>
<tr>
<td>78</td>
<td>120</td>
</tr>
</tbody>
</table>

The minimum width of trench shall be of such width as to leave, on each side of the bottom without undercutting the banks, at least six (6) inches clear space between the bell of
pipe and the sheeting or the sides of the trench where no sheeting is used.

(4) Trench Bottom: If no extra excavation is required as specified in Sub-article 408.1 (A) 2 above, the trench bottom shall be rounded so that the bottom of the pipe rests firmly for as nearly the full length of the barrel as proper jointing operations will permit. This part of the excavation shall be done manually only a few feet in advance of the pipe laying by men skilled in this type of work.

(5) Excavation for Appurtenances: Excavation for manholes, catch basins, and similar structures shall be sufficient to leave at least twelve (12) inches in the clear between their outer surfaces and the embankment.

(6) Tunneling: No tunneling will be allowed, except by special permission of the GBPA Engineer.

(B) Bracing and Shoring: The contractor shall furnish, place, and maintain such sheeting, bracing, etc., as may be required to support the sides of excavation. Bracing and shoring shall be used to prevent any movements that may injure the pipe or other underground facility, diminish the width of excavation, or otherwise delay the work or endanger adjacent pavements or other structures. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed they shall be filled immediately to the satisfaction of the GBPA Engineer.

The contractor shall be liable for damages to persons or property resulting from the work of constructing all utility structures occasioned by negligence or otherwise growing out of the failure on the part of the contractor to leave in place in the trench sufficient sheeting and bracing to prevent any caving or moving of the ground adjacent to the bank of the trench.

(C) Backfilling:

(a) Backfilling to the original ground surface or subgrade surface of openings made for structures, with a sufficient allowance for settlement, shall be a part of the excavation, although the GBPA may require that the material used in making the backfill be obtained from a source entirely apart from the structure.
(b) All material used for backfill shall be of a quality acceptable to the GBPA and shall be free from large lumps, wood, or other extraneous material.

(c) The filling above water level, behind abutments and wingwalls, and end bents or end rest piers, also around pipe culverts, box culverts, and all other structures, shall be deposited in horizontal layers, not exceeding eight (8) inches in depth, and shall be compacted to the density specified for embankment in Section 409.

(d) Where the backfill material is deposited in water the layer and density requirements shall not apply until a one (1)-foot layer of comparatively dry material is obtained, but this one (1)-foot layer shall be thoroughly compacted by tamping.

(e) Compaction in limited areas such as culvert trenches, shall be obtained by the use of mechanical tampers, approved hand tampers, or by puddling until the cover over the culvert or structure is at least one (1) foot thick.

(f) When hand tampers are used, the materials shall be deposited in layers of not more than four (4) inches. Such hand tampers shall weigh not less than fifty (50) pounds and shall have a face area of not more than one hundred (100) square inches.

(g) Special precautions shall be taken to prevent any wedging action against the masonry, and the slope bounding the excavation for abutments and wingwalls shall be stepped or serrated if required by the GBPA.

(h) Fill placed around culverts and piers shall be deposited on both sides to approximately the same elevation at the same time.

(i) Where existing pavement, curb, curb and gutter, sidewalk, or valley gutter is removed only for the purpose of constructing or removing box culverts, pipe culverts, storm sewers, inlets, manholes, etc., such pavement, etc., shall be replaced and restored to as good condition as determined by the GBPA as before removal and without direct compensation therefore. The replaced pavement, etc., shall be of the same or similar type as that removed.
(j) No backfilling shall be placed against any masonry abutment, wingwall, or culvert until permission shall have been given by the GBPA and in no case until the masonry has been in place seven (7) days.

(k) Traffic or movement of construction equipment shall not be allowed over concrete box culverts until they have been in place fourteen (14) days. If high early strength cement is used in the concrete, this period of protection may be reduced to seven (7) days.

(D) Refilling Trench If Work Is Stopped: If the work is stopped on the whole, or if any part of the trench is left open for an unreasonable length of time as determined by the GBPA Engineer, the contractor shall refill or construct bridging of such trench or part thereof to provide temporary access for vehicles and pedestrians.

(E) Pumping: The contractor shall do all the pumping or dewatering necessary in order that the construction may proceed in a workmanlike manner. He or she shall provide for the disposal of the water removed from the excavation in such a manner that will not affect public health or injure private property. The disposal of any pumping shall not be placed in any existing sanitary sewer or allowed to impede the use of the streets or sidewalks by the public, nor shall the disposal be in any storm sewer or seepage drain when sedimentation is likely to clog the sewer or reduce seepage. All drainage structures that may be affected shall be cleaned immediately prior to completion of work.

(F) Street Drainage: All gutters, drains, swales, culverts, and sewers shall be kept clean and open at all times for surface drainage. No damming or ponding of water in gutters or other drainage facilities will be permitted except to such limited extent as the GBPA Engineer considers necessary.

(G) Cleaning Up:

(a) Upon completion of the work, the subdivider shall leave the structure and all adjacent areas affected by their operations in a neat and presentable condition, and shall remove and clear up all temporary structures, rubbish, and surplus material and leave the space under the structure unobstructed and in such shape that drift will not collect nor scour be induced.

(b) All material from existing structures that have been removed by the contractor shall be piled neatly on the bank
or otherwise disposed of as directed by the GBPA. Falsework piling shall in general be pulled, except that, when permitted by the GBPA, they may be cut or broken off two (2) feet below the ground line or stream bed.

408.2 Materials:

Materials used in drainage structures shall conform to the following standards:

(1) Concrete Pipe (ten [10]-inch diameter): ASTM C-14

(2) Reinforced Concrete Pipe (twelve [12]-inch diameter or greater): ASTM C-76.


(4) Cast Iron (twelve [12]-inch diameter or greater): AASHTO Specification M-64.

(5) Standard Strength Clay Pipe: ASTM C-13


(7) Corrugated Metal Pipe: AASHTO Specification M-36

(8) Rubber Gaskets and Joint Material for Concrete Pipe: ASTM C-361 (with the additional requirement that the gasket used shall be of such cross sectional area and perimeter as to properly fit the space provided in the pipe joint in which it is to be used. Prior to use, the gasket shall be stored in as cool a place as practicable.).

(9) Mortar: Shall be mixed to a ratio of one part by volume of Portland Cement and two parts by volume of sand. The mortar shall be of the desired consistency for caulking and filling the joints of the pipe. Ten (10) percent hydrated lime by volume may be added to the mortar.

408.3.1 Design:

All drainage structures shall have the basis for design shown on sheets attached to the construction plans.

(A) Culverts: Culverts shall be of the size and type as shown on the construction plans.
(B) Pipe Culverts: Pipe culverts shall be placed at a sufficient depth below the finished grade to avoid dangerous impact pressures. Where this is not possible, special reinforcement shall be provided. All pipe culverts constructed under the supervision of GBPA or its designated Agent, and shall conform to the provisions of this Code.

(C) Trenches:

1. Trenches shall be kept free from water until the material in the joints, where concrete or clay pipes are used, and masonry have sufficiently hardened.

2. Where metal pipes are used the trenches shall be kept free from water until the bands have been thoroughly tightened and bolted in place.

3. The foundation in the trench shall be formed to prevent any subsequent settlement that might result in excessive pressure or rupture of the pipe.

4. If the foundation is rock, four (4) inches beneath the bottom of the pipe grade shall be excavated and refilled with suitable bedding material. Pipes shall be laid in these beds so that at least the lower third of each pipe is supported throughout its entire length.

(D) Pipe Laying: Pipe laying shall commence at the lowest point so that the spigot ends point in the direction of flow and be laid, ends abutting, to true line and grade. No pipe may be laid when water is above the spring line. The spring line being defined as the horizontal centre line of the pipe. The contractor shall be responsible for all dewatering of trenches as required by the GBPA.

Each piece of section of pipe shall be cleaned and inspected just before being lowered into the trench. Any section that has been damaged in handling, or is found to be defective to a degree that will materially affect the function and service of the pipe, shall be rejected for installation. Pipes having defects that have not caused their rejection are to be so laid that those defects will be in the upper half of the sewer. If any difficulty is found in fitting the pieces together, this fitting is to be done on the surface of the street before laying the pipe, and the tops plainly marked in the order in which they are to be laid. No pipe is to be trimmed or chipped to fit.
Each pipe shall be laid to the line and grade given by the GBPA Engineer. All pipes shall be laid with bells or grooves uphill and tongue end fully entered into the hub. Each pipe is to be solidly and evenly bedded, and not simply wedged up before finishing each joint. Some suitable device is to be used to find that the inverts coincide. No length of pipe shall be laid until the two proceeding lengths have been thoroughly embedded in place, so as to prevent any movement or disturbance of the finish joint.

As the pipes are laid through the work, they must be thoroughly cleansed and protected from dirt and water, and no water will be allowed to flow in the trench in any case during construction. No walking on or working over the pipes after they are laid will be permitted, except as may be necessary to backfill and compact the soil to a depth of one (1) foot above the top of the pipe.

Any sections of the pipe that is not in true alignment, or which shows any settlement after laying, shall be taken up and relaid. No pipe shall be laid except in the presence of the GBPA or his authorized inspector.

Whenever the pipe laying is discontinued, as at night, the unfinished end is to be securely protected from displacement by caving of the banks or from other injury, and a suitable stopper is to be inserted therein.

(Joints: All concrete pipe shall be carefully laid with the tongue end fully entered into the adjacent hub and true to the lines and grades given. All joints shall be thoroughly wet before applying mortar to the joint. The outside of the joint shall be sealed by the diaper method, which consists of the wrapping of the joint with a band of canvas, duck, or other suitable cloth material. After one of the edges of the cloth bank or “diaper” has been tightly stretched against the female section of the joint and the tie-wire firmly connected, the other edge of the band shall be stretched against the circumference of the other section of the pipe in such a manner that an opening is provided at the upper side of the pipe through which the mortar shall be poured and manipulated so as to completely encircle the joint.

The diaper shall cover at least the lower two-thirds of the perimeter of the pipe and shall extend on each side of the joint after the sealing is completed to the following minimum distances: two and one-half (2-1/2) inches for pipe up to thirty-six (36) inches in diameter; three (3) inches for pipe thirty-six (36) to fifty-four (54) inches in diameter, and three and one-half (3-1/2) inches for pipe over fifty-four (54) inches in diameter. The bead shall be at least
two (2) inches high at the centre both within the diaper and outside the diaper.

If necessary to facilitate the movement of mortar around the diaper, the water content of the mortar used inside the diaper shall be increased as directed by the GBPA.

The inside of the joint shall be solidly filled with mortar and shall be wiped and finished smooth.

After the initial set, the mortar on the outside shall be protected from the air and sun with a cover of wetted earth or burlap, and shall be kept protected for such period as is necessary to obtain satisfactory curing.

Bituminous joints may be used when the groundwater is below the invert of the pipe. Jointite sewer joint compound, G-K compound, Genasco Pipe Joint Asphalt, Carey Sewertite Joint Compound, or an approved equal may be used as joint material.

Twenty-four (24) hours before any bituminous joint is poured, the inside of the bell and the outside of the spigot shall be thoroughly primed by the use of the regular commercial primer recommended by the manufacturer of the bituminous jointing compound to be used for the joints. In the absence of any such commercial primer, a gasoline cutback of the bituminous jointing compound shall be used, all as approved by the GBPA.

After priming, the hemp and oakum gasket shall be properly placed and caulked, and then the spigot inserted into the hub to its full depth. The joint shall then be filled with a bituminous joint compound, using a proper form therefore and completely filling the joint at one pour.

Where rubber gasketed joints are to be used, the joint assemblies of pipe shall be manufactured to the exact dimensions, so that when the pipes are drawn together in laying the pipe, the rubber gaskets will be uniformly compressed around the periphery of each joint. Where metal joint rings are used, as part of a rubber gasketed joint, such portions that will be exposed after manufacture shall be protected from corrosion by a method approved by the GBPA. Pipe joint surfaces shall be such that the joints will be self-centering when the pipe is laid, and provisions must be made to retain the gasket in proper position.
The completed joint shall be such that it will remain tight within the limits of the exfiltration or infiltration test set forth in Section 408.3 (G).
When the Plans or Standard Details call for pipe to be laid with open joints, such joints shall be constructed as shown on Standard Detail SD-1.1.

(F) Corrugated Metal Pipe: This pipe shall be bedded firmly on the bottom of the trench and the joints securely made. When the pipe is perforated, it shall be laid with the perforations down. The pipe shall be handled in such a way that the zinc coating will not be broken, and any pipe showing such breakage of the zinc coating shall not be used.

When bituminous coating is used or specified, the pipe shall be coated in accordance with the requirements of AASHTO M-190.

(G) Infiltration or Exfiltration Test:

(1) Criteria: GBPA will reject any section of sewer pipe in a positive system if the infiltration or exfiltration exceeds one thousand (1,000) gallons per inch of pipe diameter per mile of pipe per twenty-four (24) hours.

(2) Method of Test: The pipe sewers and manholes shall be tested by submitting them to pressure equal to a two (2)-foot head of water and measuring the rate of exfiltration. The static level during the testing shall be maintained two (2) feet above the crown. Where the crown of the pipe is below the water table at the time and place of testing, the static level during testing shall be maintained two (2) feet above the water table. All labour, materials, and equipment for the test shall be furnished by the contractor at his/her expense as required by the GBPA.

(H) Backfilling: Backfilling shall be of selected material and shall be deposited in uniform layers and compacted by tamping to an elevation one (1) foot above the top of the pipe.

(I) French Drains: French drains shall conform to the standards of this Code or as shown on the construction plan as approved by the GBPA.

(J) Drainage Wells: Drainage wells shall be constructed as shown in the standards of this Code - see Section 512.
(K) Bridges and Box Culverts: Bridges and box culverts shall be designed by a qualified engineer licensed by the GBPA and shall conform to good engineering practice. Special drawings will be required for approval of the GBPA.

(L) Storm Sewers: All storm sewers shall be constructed in accordance with this Code.

(M) Manholes: All manholes shall be constructed in accordance with this Code. The work specified in this Section consists of constructing storm sewer manholes either “precast” or “cast in place” with Class I concrete and reinforcing steel or of brick masonry with the necessary metal frame and cover. They shall be constructed in accordance with these specifications and in conformity with the Plans or Standard Details.

(1) Materials:

Concrete: Concrete shall be Class I concrete.

Reinforcing Steel: All steel reinforcement shall be either intermediate or hard grade and shall conform to the requirements of ASTM A-15, or ASTM A-16. All reinforcement bars larger than one-fourth (1/4) inch diameter shall be deformed bars conforming to the requirements of ASTM A-305.

Brick Masonry: Brick used in masonry shall be either clay or shale brick meeting the requirements of ASTM C-62 or concrete building brick meeting the requirements of ASTM C-55.

Mortar: Mortar shall be as specified in Sub-article 408.2 (9).

Frame and Cover: The quality of materials used in the manufacture of frame and cover shall be Class 30, grey iron castings that conform to the requirements of ASTM Designation A-48 (AASHTO M-105,). They shall be cast to the size and dimensions shown on Standard Detail SD-4.4, or an approved equal.

Castings shall be of uniform quality, free from blow holes, porosity, hard spots, shrinkage, defects, cracks, or other injurious defects. Castings shall be boldly filleted at angles and arises shall be sharp and perfect. They shall be smooth well cleaned by blasting.
All castings are to be manufactured true to pattern and with satisfactory fit of component parts. The frame and cover shall be of a non-rocking design or with machined ground surfaces so fitting parts will not rattle or rock under traffic. The weight of the frame and cover shall be within a two (2) pound tolerance of those weights shown on the Standard Details. All castings shall be clean and neatly finished with a coating of coal-tar pitch varnish.

(2) Construction: Manholes shall be built at the points indicated on the Plans or as directed by the GBPA. Manholes shall be constructed in accordance with Standard Details SD-2.6, and SD-3.6.

Brick masonry in manholes shall be built of brick and mortar of the specified quality. Every fifth course of brick shall be laid as stretchers, the remainder being laid as headers. Every brick shall have full mortar joints on the bottom and sides, which shall have been formed at one operation by placing sufficient mortar on the head and forcing the brick into it. Horizontal joints shall not exceed three-eighths (3/8) of an inch and the vertical joints on the inside of the manhole shall not exceed one-fourth (1/4) of an inch.

In the walls of manholes a limited amount of half-brick may be used not exceeding one-third of the whole, if properly bonded with whole brick.

Brick manholes shall have a plaster coat of mortar one-half (1/2) of an inch in thickness on the inside and outside. Mortar shall be as specified in Sub-article 408.2 (9).

Reinforced concrete manholes shall be constructed of Class I concrete. The placing and handling of reinforcing steel shall be as shown and called for on plans and approved by the GBPA Engineer. Forms shall be designed and constructed so that they may be removed without injury to the concrete and shall be left in place for at least twenty-four (24) hours after the concrete is poured. Concrete shall be thoroughly tamped while placing and shall be cured for at least three (3) days after removal of forms. All holes and voids on the surface shall be filled with sand cement mortar.

When the manhole is completed, a frame and cover as previously specified shall be set in place to the line and
grade given by the design engineer and then bolted down as shown on the Standard Details.

(3) Precast Construction: The contractor may, at his or her option, use precast manholes provided they are constructed in accordance with Standard Detail SD-3.6.

(4) Placing Pipe: Inlet and outlet pipe shall be of the same size and kind as the connecting pipe shown on the plans. They shall extend through the walls for a distance beyond the outside surface sufficient for the intended connections, and the concrete shall be constructed around them neatly so as to prevent leakage along their outer surface. The inlet and outlet pipes shall be flush with the inside surface of the wall.

(5) Steps: When called for on the plans or ordered by the GBPA Engineer, steps of the type shown on Standard Detail SD-4.6, or an approved equal shall be set in place on the inside of the manhole. They shall be firmly built in the wall starting two (2) feet above the bottom and placed not more than fifteen (15) inches apart. The steps shall project between six (6) inches and eight (8) inches from the finished inside face of the manhole.

(N) Catch Basins:

(1) Description: The work specified in this Section consists of constructing catch basins precast or cast in place with type Class I concrete and reinforcing steel or brick masonry with the necessary metal frame and grate. They shall be constructed in accordance with these specifications and in conformity with the Plans or Standard Details.

(2) Materials:

Concrete: Concrete shall be Class I concrete.

Reinforcing Steel: Reinforcing steel shall be as specified in section 408.3 (M) (1).

Brick Masonry: Brick used in masonry shall be as specified in section 408.3 (M) (1).

Mortar: Mortar shall be as specified in Sub-article 408.2 (9).
Frame and Grate: The quality of materials used in the manufacture of frame and grate shall be Class 30, grey iron castings that conform to the requirements of ASTM A-48, (AASHTO Specification M-105.). They shall be cast to the size and dimensions shown on Standard Detail SD-2.3, or an approved equal. Castings shall be of uniform quality, free from blow holes, porosity, hard spots, shrinkage, defects, cracks, or other injurious defects. Castings shall be boldly filleted at angles and aries shall be sharp and perfect. They shall be smooth and well cleaned by blasting.

All castings are to be manufactured true to pattern and with satisfactory fit of component parts. The frame and grate shall be of non-rocking design or with machined ground surfacers so fitting parts will not rattle or rock under traffic. The weight of the frame and cover shall be within a two (2)-pound tolerance of those weights shown on the Standard Details. All castings shall be clean and neatly finished with a coating of coal-tar pitch varnish.

Construction: Catch basins shall be built at the points indicated on the Plans or as directed by the design engineer. They shall be constructed in accordance with the size dimension and notes shown on Standard Detail SD-2.1.

Catch basins shall be located within the ROW as shown on Standard Detail SD-2.4, or SD-2.5. The pavement around catch basins constructed in the swale shall conform to the following specifications:

1. Limerock Base
2. Type I Asphaltic Concrete

Swale areas adjacent to the paved area around catch basins shall be properly graded to lead stormwater into the catch basin.

Brick masonry in catch basins shall be built of brick and mortar of the specified quality. All brick shall be saturated with water before being laid. The brick shall be laid using the shovejoint method so as to bond them thoroughly into the mortar. Headers and stretchers shall be so arranged as to bond the mass thoroughly. A limited amount of half-brick may be used not exceeding one-third of the whole, if properly bonded with whole brick. Joints shall be
finished properly as the work progresses and shall be not less than one-fourth (1/4) inch and not more than one-half (1/2) inch in thickness. No spalls nor bats shall be used except for shaping around irregular openings or when unavoidable at corners. Only experienced bricklayers shall be employed on this work.

Brick catch basins shall have a plaster coat of mortar one-half (1/2) of an inch in thickness on the inside and outside, mortar shall be as specified in Sub-article 408.2 (9).

When the catch basin is to be constructed of concrete, the forms shall be placed to the depth shown on the Plans or as directed by the GBPA Engineer. The placing and handling of reinforcing steel shall be as specified in Section 408.3 (M) (1). After the concrete has been poured, it shall be thoroughly tamped and spaded. After the concrete has hardened sufficiently, the forms shall be removed and the concrete covered with suitable material to keep it moist for a period of three (3) days or longer if necessary. It shall be protected, in a satisfactory manner, from the elements until thoroughly hardened.

After the concrete has been cured as specified above, the frame of the casting shall be set in a full mortar bed.

(4) Precast Construction: The contractor may, at his or her option, use precast catch basins constructed in accordance with Standard Details SD-2.2.

(5) Placing Pipe: Inlet and outlet pipe shall be of the same size and kind as the connecting pipe. They shall extend through the walls for a distance beyond the outside surface sufficient for the intended connections. The concrete shall be placed around them neatly so as to prevent leakage along their outer surface. The inlet and outlet pipes shall extend three (3) inches inside the inner surface of catch basin.

A one-half (1/2)-inch mesh galvanized screen with removable clamp, as approved by the GBPA Engineer, shall be placed on the outlet pipe.
O Inlets

(1) Description. The work specified in this Section consists of constructing a swale inlet or a curb inlet with Class I concrete, reinforcing steel, and the necessary frame, grate, or cover. They shall be constructed in accordance with these specifications and in conformity with the Plans or Standard Details.

(2) Materials:
Concrete: Concrete shall be Class I concrete, minimum strength three thousand (3,000) psi.
Reinforcing Steel: Reinforcing steel shall be as specified in Sub-article 408.3 (M) (1).
Mortar: Mortar shall be as specified in Sub-article 408.2 (9).

Frame Grate and Cover: The quality of materials used in the manufacture of frame and cover shall be Class 30, grey iron castings that conform to the requirements of ASTM Designation A-48 (AASHO Specification M-105). The frame and grate for the swale inlet shall be cast to the size and dimensions shown on Standard Detail SD-2.3, and the frame and cover for the curb inlet shall be cast to the size and dimensions shown on Standard Detail SD-3.3, or an approved equal. Castings shall be of uniform quality, free from blow holes, porosity, hard spots, shrinkage, defects, cracks, or other injurious defects. Castings shall be boldly filleted at angles and arises shall be sharp and perfect. They shall be smooth and well cleaned by blasting. All castings are to be manufactured true to pattern and with satisfactory fit of component parts. The frame and grate shall be of a non-rocking design or with machined bearing surfaces so fitting parts will not rattle or rock under traffic. The weight of the frame and cover shall be within a two (2)-pound tolerance of these weights shown on the Standard Details. All castings shall be clean and neatly finished with a coating of coal-tar pitch varnish.

(3) Construction. Inlets shall be built at the point indicted on the Plans or as directed by the GBPA Engineer. They shall be constructed in accordance with the size, dimensions, and notes shown on Standard Detail SD-3.1 or SD-3.2.

When inlets are to be cast in place, the forms shall be set to the depth shown on the Plans or as directed by the GBPA Engineer. The placing and handling of reinforcing steel
shall be as specified in this Code. After the concrete has been poured, it shall be thoroughly tamped and spaded. After the concrete has hardened sufficiently, the forms shall be removed and the concrete covered with a suitable material to keep it moist for a period of three (3) days or longer if necessary. It shall be protected, in a satisfactory manner, from the elements until thoroughly hardened. After the concrete has been cured as specified above, the frame shall be set in a full bed of mortar. Swale inlets to be constructed in a driveway or swale shall be located as required for catch basins (Standard Details SD-2.4 or SD-2.5).

The pavement around inlets constructed in the swale shall conform to the following specifications:

1. Limerock Base
2. Type I Asphalitic Concrete

Swale areas adjacent to the paved area around inlets shall be properly graded to lead storm water into the inlets.

(P) Seepage Drain

(1) Description: The work specified in this Section consists of constructing a seepage drain in accordance with these specifications and conforming to the dimension and notes of Standard Detail SD-1.1.

(2) Materials:

Ballast Rock: All ballast rock shall be washed aggregate and free of deleterious matter. It shall not have more than forty-five (45) percent loss of section as specified by AASHTO Specifications M-63, governing the Lost Angles Abrasion Test. It shall not show more than a ten (10) percent loss in 10 cycles as specified by AASHTO Specifications M-63 governing the soundness test. The ballast rock shall meet the gradation requirements as specified by AASHTO Specifications M-43 for size number 24 (two and one-half [2-1/2] to three-fourths [3/4] inch) or number 4 (one and one-half [1-1/2] to three-fourths [3/4] inch). GBPA reserves the right to have sample tests made of the material at selected intervals by an approved laboratory at its expense.
Pipe: Pipe shall be as specified in this Section.
Concrete: Concrete shall be Class I concrete.

(3) Construction: The seepage drain shall be excavated to the depth required in accordance with Section 402.

Ballast rock shall be placed in the trench to the level of the bottom of the proposed pipe. The bell and spigot pipe shall be laid with all joints open, as shown on the typical section of Standard Detail SD-1.1. A wooden wedge or other approved method shall be used to centre the spigot in the bell.

After the pipe has been laid and approved, ballast rock shall be placed carefully so as not to displace the pipe, around and over the pipe to the depth shown on Standard Detail SD-1.1. One layer of thirty (30)-pound felt shall be placed over the rock. The trench shall then be backfilled and the surface restored in accordance with the road specifications of this Code.

Where the seepage drain is permitted to be constructed under pavement areas, an eight (8)-inch reinforced concrete slab as shown on Standard Detail SD-1.1 shall be placed continuous over the drain.

(Q) Seepage Trench:

(1) Description: The work specified in this Section consists of constructing a seepage trench in accordance with the specifications and conforming to the dimensions and notes shown on the Plans or Standard Details.

(2) Materials:

Concrete: Concrete shall be Class I concrete as specified except as noted herein.
Inlet Pipe: Inlet pipe shall conform to the requirements of Section 306.

(3) Construction: The seepage trench shall be excavated to the required depth in accordance with Section 408.1. Inlet pipe shall be provided and laid in accordance with Section 308. A concrete collar may be constructed of non-structural concrete, which is a concrete meeting a compressive strength of not less than two thousand (2,000)
psi and cast in place to the size required by the GBPA Engineer.
A concrete slab shall be placed for the entire length of the trench.
Catch basins, frame grate, and leveling course when permitted shall be constructed on the concrete slab in accordance with Section 308.3 (N).
Surfaces disturbed by the installation of a seepage trench shall be restored in accordance with the road specification in this Code.

409 FILL

409.1 Purpose: The following requirements are set forth as a means of controlling the quality and placement of fill necessary to bring land, including tidal areas, to the proper elevation.

409.2 Requirement: Fill shall be placed over the entire subdivision to an elevation, after settlement, of not less than 7.0 Freeport datum, or as directed by the GBPA. Swales or drainage ways, sinkholes, and environmentally sensitive lands as designated as preserve areas by the GBPA, shall be left as landscape features. Pools or basements may be below 7.0 if approved by the GBPA.

409.3 Quality and placement of fill for private lands

(A) Removal of Overburden from Existing Surface: The removal of organic material or other undesirable overburden may be required by GBPA prior to filling. Factors affecting the decision for removal will include depth and quality of undesirable overburden, depth of fill to be placed above overburden, and proposed use of the area to be filled.

(B) Fill materials for areas where depth of fill will be more than two (2) feet.

(1) Acceptable Fill Material:

1 A sand and rock mixture is considered to be the most desirable material for fill.

2 In lieu of sand and rock for the total fill, portions of the fill may be composed of reinforced concrete rubble masonry provided the largest dimension does not exceed three (3) feet nor one half the depth of fill, whichever is smaller. The reinforcing steel from reinforced concrete rubble shall not protrude more
than twelve (12) inches nor shall it project above the finished surface of the fill.

(2) Unacceptable Fill Material. Peat, muck, wood, tree stumps, roots and branches, metal products or other material that will not readily compact into an unyielding mass shall not be used as fill.

(C) Fill materials for areas where depth of fill will be two (2) feet or less or for the upper two (2) feet of a fill that will be greater than two (2) feet

(1) Acceptable Fill Material. Same as for fills greater than two (2) feet, except that a percentage of the fill in lawn or park areas may be peat or muck sufficient to provide a good quality top soil.

(2) Unacceptable Fill Material. Same as for fills greater than two (2) feet, except for the peat or muck content, as described in 409.3.B.2 above.

409.4 Method of Placement. The GBPA shall approve the method of placement of fill. In addition to the above requirements, the upper three (3) feet of fill shall be of such quality that when placed it will provide natural surface seepage of an infiltration rate of one (1) inch per hour after saturation.

409.5 Fill Protection. The extremities of an embankment that has been placed in accordance with these requirements and is not protected by bulkheading shall be protected against excessive erosion by rip-rapping or other acceptable preventive measures.

409.6 Filling of Areas Dedicated or Proposed to be Dedicated as Public ROW for Roads.

All areas dedicated or proposed to be dedicated as public ROW for road purposes shall be filled in accordance with the requirements as set forth in GBPA Planning and Development Code.

409.7 Control of Work. All filling operations made pursuant to these requirements shall be performed under continuous supervision of an qualified engineer licensed by the GBPA. A certification from this engineer may be required at the completion of the work as an assurance that the fill has been placed in accordance with these requirements. A subdivision bond involving fill will not be released without such certification.
Building Foundation. It is not to be construed that fill placed in accordance with these requirements will produce a foundation suitable for a building structure of any type. The foundation requirements for buildings are covered in the Building Code. Building permits issued by GBPA for structures to be located on fill require an engineer’s certification as to the bearing value of the soil at the building site. When the building site is known prior to filling, it would be advisable to place the building foundation in a manner that will satisfy the Building Code concurrent with filling the surrounding area.

410 WATER SUPPLY

This Section sets forth criteria, procedures, and minimum standards for the design of all water supply systems to be constructed in the GBPA area and approved by the GBUC.

A public water system is one serving or designed to serve 25 or more persons, or otherwise making water available to public groups or to the public in general. Potable water is required for schools, private residences, hotels, apartment houses, eating places, stores, factories, camps, institutions, public buildings, and other places where water is served to employees, customers, patrons, or general public. This water must be secured from public water supplies, where available, or from another approved source where a public water supply is not available. Large hotels, institutions, or industrial plants may use their own private supplies provided these supplies meet the same standards as for public water system.

410.1 Wells: All wells, for whatever purpose, shall conform to this Code.

410.2 Plants: All plants for supplying or treating potable water shall conform to this Code. Concrete, steel, and piping shall conform to the applicable sections of this Code. All electrical work shall conform to the Canadian Electric Code.

410.3 Distribution Systems. Every such system shall be designed by a qualified engineer licensed by the GBPA, and in accordance with the requirements of the construction requirements and standard specification of this Code. The term “system” used herein shall include extensions and modifications thereof. The design engineer shall furnish design calculations upon request; in addition, all engineering drawings showing water distribution mains shall indicate:

1. The design flows in gpm and pressure in psi.

2. Where water and sewer mains cross with less than eighteen (18) inches vertical clearance, the sewer will be twenty (20) feet of either cast iron pipe or concrete encased vitrified clay pipe, centred on the point of crossing. When a water main parallels a sewer main
a separation of at least ten (10) feet should be maintained where practical. Where five (5) feet is not practical, the proposed alternative design must be approved by the GBPA.

Certification:

The design engineer shall furnish minimum information when the work is completed.

(1) A certification by the design engineer that the work has been done in accordance with the approved plans and specifications, except as shown on the “as-built” drawings.

Note: All changes must have prior written approval of the GBPA or its delegate.

(2) Two complete sets of “as-built” drawings and specifications. (If different than as approved see Note above.

(3) Bacteriological test results approved by the GBPA and the GBUC.

(4) A summary of quantities of mains, connections, hydrants, meters, and other items.

(5) Final construction cost and identity of contractor.

(A) Excavation:

(1) Trenching shall be carefully done to string lines laid out at the locations shown on the drawings. Width of pipe trenches shall not be more than two (2) feet wider than the outside diameter of the pipe.

(2) The bottom of the trench shall be kept free from all water during pipe laying operations.

(3) Material excavated from the trench shall be deposited along the streets in such a position and manner as to cause minimum interference with street traffic and minimum blocking of entrances to private property.
(4) Rock excavation shall be to an elevation four (4) inches below the bottom of trench grade and the bottom of the trench shall be filled to grade with selected bedding material.

(5) Materials used in the construction of water supply systems shall conform to Section 410.8 (F) of this Code.

(B) Pipe Laying:

(1) All pipe of whatsoever material shall have a minimum cover of two (2) feet six (6) inches to the top of the barrel of the pipe.

(2) Pipe shall be carefully aligned and laid to the specified grade in the trench. No pipe shall be installed in water in the trench and after installation, open ends of the line shall be protected against entry of water and dirt from the trenches.

(3) Pipe shall be laid in with the directions of the manufacturer of the particular type of pipe to be used.

(C) Backfill:

(1) When the pipe has been installed in the trench and the joints connected, backfilling along the run of pipe between points shall be commenced.

(2) Backfill material shall be free of roots or organic material, rocks over two (2) inches or other unsuitable material. All fill from the trench bottom to a point six (6) inches above the top of the pipe shall be sanded or selected material.

(3) Backfill under pavement cuts shall be compacted so that the upper twelve (12) inches of the subgrade shall have
compaction equal to that required for roads and streets under this Code.

(D) Concrete thrust shall be blocklined at all trees, crosses, bends, and hydrants in accordance with the Standard Details of this Code.

(1) Service connections, goosenecks, taps, and service runs shall be made in accordance with the Standard Details of this Code.

(2) Suitable barricades, construction signs, torches, lantern, and guards shall be provided for the protection of the work and the safety and health of the public.

When the hydrostatic testing is completed and before use, the pipe shall be sterilized in accordance with AWWA Specification C 601.54.

410.4 Public or Subdivision Water Supply: Where a public water or subdivision water supply is required, each lot within the subdivision area shall be provided with a connection thereto. All systems and extensions thereto shall be subject to the approval of the GBPA in accordance with the specifications and standards of this Code.

410.5 Individual Wells: Individual wells will be permitted only as follows:

(A) For purposes of this section, a well is deemed as any opening in the ground, regardless of size or shape, designed to conduct water to or from an underground stratum to the surface of the ground.

(B) All wells shall be drilled by a firm or person having a proper permit from the GBPA and being licensed to perform such work. Said firm or person shall be required to maintain a competent driller and drilling rig, have and maintain in good condition a pump with a fifty (50) gallon per minute (gpm) capacity and fifty (50) feet of two (2)-inch suction hose and have the necessary tools to cut and thread pipe. The driller shall keep an accurate boring log of the various strata pierced and within three (3) days after completion of a well shall furnish three copies of such log together with a detailed drawing showing location and construction of the well to the GBPA, where requested by the Development Agent.

(C) Well Standards:

(1) Irrigation Wells:
1  Size: Unspecified

2  Casing: None

3  Pumping Rate: Single family residence – five hundred (500) gallons per hour (gph) maximum. Estate and other than single family residences – twenty-five (25) gpm maximum.

4  Well Spacing: Single family residence – one hundred (100)-foot centres minimum. Estate and other than single family residences – two hundred (200)-foot centres minimum.

(2) Central System Wells:

1  Size: Eighteen (18)-inch diameter

2  Casing: None required, but top to be sealed

3  Depth of Well: No deeper than 10 ft. mlw

4  Pumping Rate: Fifty (50) gpm maximum - not to exceed sixteen (16) hours a day.

5  Well spacing: Fifteen hundred (1,500)-foot centres

(3) Fire Wells:

1  Size: Nine (9)-inch diameter

2  Casing: PVC to EL – thirty-five feet (35 ft.) mlw

3  Depth of Well: Elevation – forty feet (40 ft.) mlw

4  Pumping Rate: Unspecified

5  Well spacing: One thousand (1,000)-foot minimum

(4) Disposal Wells:

1  Size: Nine (9)-inch diameter

(D) Abandonment and Closing: All wells abandoned or temporarily closed shall be done in an approved manner as determined by the GBPA. Capping of the casing top only is insufficient and unacceptable.
410.6 Fire Hydrants: Fire hydrants and/or fire wells shall be installed in all subdivisions as may be required by the GBPA in accordance with the standards of this Code.

410.7 Sources:

(A) All sources of supply of potable water shall conform to the requirements of this Code.

(B) Water systems serving more than 25 persons shall be designed by a qualified engineer licensed by the GBPA and shall make provisions for the necessary extensions thereof and connections of other systems thereto.

(C) All non-potable water systems, wells, etc., shall be appropriately marked.

(D) Fire wells shall be marked and guarded against use as a potable water supply.

410.8 Design:

(A) Wells:

Design of all wells, pumps, piping tanks, valves, and any appurtenances of private or public, single or multi-unit water supply systems shall be approved by the GBPA before construction.

(B) Plant Design: All plants for public water supply shall be based on the following minimum design criteria and unit design criteria where applicable.

(1) Population: Projected population from five (5) to fifteen (15) years based on 3.5 persons to a single family dwelling.

1 Twenty-four (24)-hour average equal to seventy-five (75) gallons per capita day.

2 Sixteen (16)-hour average equal to one hundred fifty (150) percent twenty-four (24)-hour average.

3 Maximum day equal to one hundred fifty (150) percent of sixteen (16)-hour average equal to four-hundred-fifteen thousandths (0.415) gallons per minute per connection.
4 Maximum day equal to one hundred eighty-five (185) percent for twenty-four (24)-hour plants.

5 Maximum hour equal to two hundred (200) percent maximum day equal to eighty-three hundredths (0.83) gpm per connection.

(2) Plant Capacity:

1 Chlorination capacity shall equal maximum day.

2 Throughput plus 50% maximum day storage.

(3) Raw Water Supply: Raw water supply shall be equal to maximum day.

(4) High Service Pumps:

1 Without elevated storage high service pumps shall provide capacity in gpm equal to the maximum hourly rate.

2 With elevated storage, high service pumps shall provide capacity in gpm equal to or greater than plant throughput.

(5) Auxiliary Power: Auxiliary power shall be required on raw water supply and high service pumps to operate system based on one-half (1/2) maximum day requirements.

(6) Elevated Storage: Where elevated storage is used the capacity and height will be based on fire requirements (where included), plant throughput, and maximum hour demand.

(C) Distribution System:

(a) The distribution system shall be designed on a basis of eighty-three hundredths (0.83) gpm per connection for a single family dwelling or equivalent.

(b) A rational method of determining the loss of head and quantity of flow such as the Hardy Cross Method or equivalent as approved by the GBUC shall be used in designing distribution systems.
(c) Dead ends shall be avoided wherever possible but where dead ends occur valves or hydrants shall be install for blowing off the line.

(d) Valves shall be placed so that no more than five hundred (500) feet of main shall be out of service in medium and high density population districts and no more than one thousand (1,000) feet of main shall be out of service in low density population districts.

(e) Location. Water mains shall be installed in ROWs only on the north or east sides of the ROWs unless changed by reason of interference with existing utilities, the platting of half streets, or other approved valid reasons. These requirements may be modified in special cases only by specific approval. For required locations of water mains and other utilities in ROWs, see General Detail series G 2.1, Utility Placement Within a Right-of-Way for Residential and Arterial Streets.

Water mains will be extended within the public ROW, the entire length of the property being served.

(f) Basis of Design. Sizes of mains will depend upon fire demand, special industrial and commercial requirements, and the peak domestic demand, whichever is the greatest. Every system shall be designed to meet required flows under the following condition:

Treatment and supply shall meet the requirements as determined by the maximum daily demand plus fire demand. Where treated water storage is provided, consideration of reduced requirements may be made. In every case, the plant shall be capable of meeting not less than the Maximum Daily Demand.

(g) Sizing. Trunk mains shall meet the requirements of peak day demand or fire demand plus maximum daily demand. Provision must be made to size trunk mains for ultimate flows through areas consistent with GBPA’s latest land use plan and not just for the immediate area demands.

Transmission facilities without distribution storage must provide sufficient capacity to meet maximum day demand plus fire demand or maximum hour demand, whichever is greater. Specifically, distribution systems shall be designed to meet:
1. Peak hour plus industrial demand with a residual pressure of not less than thirty (30) psi.

2. Fire demand plus maximum daily demand with a residual of not less than twenty (20) psi at the point of the fire demand.

3. Daily storage on maximum days must be refilled within twenty-four (24) hours after draft has started. Fire storage must be restored in forty-eight (48) hours plus A.D.D.

The following formula derived from Sarchet, B.R. and A.P. Colburn: Ind. Eng. Chem., 32:1240 (1940) may be used to select pipe size: (See reference 8.):

\[
De = 0.443 \times (gpm)^{0.45}
\]

Where \( De \) = Economic pipe diameter in inches

\( gpm = \) Gallons per minute required to meet maximum demand

Heavy sprinkler use and the resulting increased water demand shall be considered in sizing water mains.

In general, a minimum of an eight (8)-inch diameter pipe will be required of mains requiring fire hydrants.

(h) Hydraulic Design. In computing pressure contours in distribution grids, friction losses in mains will be computed by the Hazen and Williams formula. The value of the “C” factor to be used in this formula is one hundred (100), except for mains of twelve (12)-inch diameter and larger where a “C” of one hundred twenty (120) may be used.

In cases of extensions to existing systems, pressure contours in the extension will be computed on the basis of the entire system including extensions. Pressure contours will be computed over the entire system in order to demonstrate that the system meets the requirements stated above. (Node pressures, annotated, may be substituted for contouring in case of small systems, or additions covering areas no greater than one [1] square mile.)

(i) Supply. Direct pressure distribution systems will be considered only in small systems where the use of storage
tanks is not economically feasible. In any direct pressure system a hydro-pneumatic tank with adequate control system shall be used. All pumping systems shall have a reserve pumping unit for emergencies, and at least one of the pumps supplying domestic needs shall be dual-powered or shall have an auxiliary power source. Fire pumps shall be driven by internal combustion engines with dual electric drives optional.

Where an independent, questionable water supply is approved for processing, cooling, fire protection, irrigation, or other non-domestic use, the pipe lines used for such independent, questionable supply shall be unmistakably identified by marking of a distinctive yellow color. There shall be no physical connection between a safe approved potable water supply and a questionable supply or a sanitary or storm sewage system that could allow unsafe water to enter the safe water system by direct pressure, vacuum, gravity, or other means.

For water distribution systems designed in accordance with this manual, the normal maximum pressures will generally fall within the range of sixty (60) to seventy-five (75) psi at ground elevation, however, pressures shall not exceed one hundred (100) psi. In a system using fire pumps, pressure will be allowed to rise to one hundred twenty-five (125) psi for short periods during testing or operation of these pumps, however, where the pump curves indicate a shut-off head in excess of one hundred twenty-five (125) psi, pressure relief valves shall be installed at the pumping station and set at one hundred ten (110) pounds per square inch gauge (psig).

(D) Fire Protection:

A. Actual flow requirements, spacing, and location of fire hydrants shall be determined by the GBPA. The following recommendations are to be used as guidelines in planning.

B. Fire flows are determined on the basis of structural conditions and population of buildings. See Table 400.9 below for required fire flows by zoning classification.
TABLE 400.9
REQUIRED FIRE FLOWS BY ZONING CLASSIFICATION

<table>
<thead>
<tr>
<th>Class</th>
<th>Required Fire Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-4, R-6</td>
<td>The system shall deliver not less than 750 gpm at 20 psi residual on the system. Each fire hydrant shall deliver not less than 500 gpm.</td>
</tr>
<tr>
<td>R-D</td>
<td>The system shall deliver not less than 1,500 gpm at 20 psi residual on the system. Each fire hydrant shall deliver not less than 500 gpm.</td>
</tr>
<tr>
<td>hospitals, schools</td>
<td>The system shall deliver not less than 2,000 gpm at 20 psi residual on the system. Each fire hydrant shall deliver not less than 750 gpm.</td>
</tr>
<tr>
<td>I-1, I-2, I-3</td>
<td>The system shall deliver not less than 3,000 gpm at 20 psi residual on the system. Each fire hydrant shall deliver not less than 1,000 gpm.</td>
</tr>
</tbody>
</table>

In structures requiring standpipe or fire sprinklers, fire hydrants shall be provided not more than one hundred fifty (150) feet from the siamese connection.

C. Hydrant Spacing:

1. Single story residential – hydrants shall be so located that the maximum hose travel distances, as measured in streets ROWs, will not exceed one thousand (1000) feet to the enter of the lot or to the edge of the structure being protected, and no more than one thousand (1000) feet apart.

2. Multi-story residential – hydrant spacing along a main shall not exceed one thousand (1000) feet, nor shall a hydrant be more than one thousand (1000) feet from the structure being protected.

3. Commercial and industry – hydrant spacing along a main shall not exceed one thousand (1000) feet nor shall a hydrant be more than one thousand (1000) feet from the structure being protected. The GBPA reserves the right to require closer spacing or locating a fire hydrant closer to a structure if in its sole determination an inherently hazardous situation exists.

4. Schools, hospitals, institutions, prisons, and nursing homes – two hydrants not more than three hundred
(300) feet apart must be provided to protect each structure.

D. Fire hydrant branches (from main to hydrant) shall not be less than six (6) inches in diameter and as short as possible with a maximum permissible length of fifty (50) feet. Each branch will be individually gate valved. Except where intermediate hydrants may be required on a long block, fire hydrants shall be at street intersections and located as shown on General Detail G 2.1, Utility Placement Within a Right-of-Way.

E. All fire hydrants shall be of the break-away design, or as approved by the GBPA. In commercial areas, but not in residential areas, fire hydrants shall be protected by guard posts from vehicular damage, as shown on Detail WS 4.5 except where traffic safety or lack of clear space will not allow their installation.

F. Hydrants shall not be located within three (3) feet of any obstruction nor in front of entrance ways, and the pumper discharge shall face the nearest roadway. The centre of the lowest outlet shall be not less than eighteen (18) inches above the surrounding grade and the operating nut shall not be more than four (4) feet above the surrounding grade. No connections will be made to hydrants or hydrant lines, either for permanent or temporary use, except under emergency conditions by specific authority of the Fire Department.

G. Where required that fire hydrants lie within a private property, appropriate easements and accessibility shall be dedicated to the utility serving the property.

(E) Valves and Services:

A. Valves shall be installed at intervals of not more than three thousand (3,000) feet in long transmission mains; at intervals of not more than one thousand (1,000) feet in main distribution loops or feeders; and on all primary branches connected to these lines. In high value areas, valves will be installed so that the average length of pipe affected by a break will not exceed one block or five hundred (500) feet; elsewhere, the length shall not exceed two blocks, or one thousand (1,000) feet.
Except in cases of long blocks where additional valves will be required, valves shall be installed at street intersections. Typical valve locations shall be as shown on General Detail G 2.1, Utility Placement Within a Right-of-Way. Details of valve installation shall be as shown on Standard Water Supply Detail WS 1.0, Typical Valve Setting.

B. Air release and vacuum break valves will be installed at prominent peaks on long supply mains only. Air valves will not generally be necessary in the grid distribution system where air accumulations will normally be released through services lines. See Standard Water Supply Detail WS 1.60, Air Relief Valve and Vault.

C. Services

The following table (Table 400.10) provides suggested sizes of water meter and taps as a guide:

<table>
<thead>
<tr>
<th>NO. OF FIXTURE UNITS</th>
<th>DIAMETER OF WATER PIPE</th>
<th>RECOMMENDED METER SIZE (inches)</th>
<th>APPROX. PRESSURE LOSS METER + 100' PIPE (psi)</th>
<th>NO. OF FIXTURE UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLUSH TANK WC&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>FLUSH TANK valve WC&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>3/4</td>
<td>5/8</td>
<td>30</td>
<td>–</td>
</tr>
<tr>
<td>19-55</td>
<td>1</td>
<td>1</td>
<td>30</td>
<td>–</td>
</tr>
<tr>
<td>–</td>
<td>1/4</td>
<td>1</td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>56-85</td>
<td>1 1/4</td>
<td>1</td>
<td>30</td>
<td>–</td>
</tr>
<tr>
<td>–</td>
<td>1 1/8</td>
<td>1</td>
<td>30</td>
<td>10-20</td>
</tr>
<tr>
<td>86-225</td>
<td>1 1/2</td>
<td>1 1/2</td>
<td>30</td>
<td>–</td>
</tr>
<tr>
<td>–</td>
<td>1 1/2</td>
<td>1 1/2</td>
<td>30</td>
<td>21-77</td>
</tr>
<tr>
<td>226-350</td>
<td>2</td>
<td>1 1/2</td>
<td>30</td>
<td>–</td>
</tr>
<tr>
<td>–</td>
<td>2</td>
<td>1 1/2</td>
<td>30</td>
<td>78-175</td>
</tr>
<tr>
<td>351-550</td>
<td>2</td>
<td>2</td>
<td>30</td>
<td>–</td>
</tr>
<tr>
<td>–</td>
<td>2</td>
<td>2</td>
<td>30</td>
<td>176-315</td>
</tr>
<tr>
<td>551-640</td>
<td>2 1/2</td>
<td>2</td>
<td>30</td>
<td>–</td>
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<td>–</td>
<td>2 1/2</td>
<td>2</td>
<td>30</td>
<td>316-392</td>
</tr>
<tr>
<td>641-1340</td>
<td>3</td>
<td>3</td>
<td>22</td>
<td>–</td>
</tr>
<tr>
<td>–</td>
<td>3</td>
<td>3</td>
<td>22</td>
<td>393-940</td>
</tr>
</tbody>
</table>
### TABLE 400.10 (b) WATER DISTRIBUTION SYSTEM DESIGN CRITERIA REQUIRED CAPACITY AT FIXTURE SUPPLY PIPE OUTLETS

<table>
<thead>
<tr>
<th>FIXTURE SUPPLY OUTLET SERVING</th>
<th>FLOW RATE(^a) (gpm)</th>
<th>FLOW PRESSURE (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathtub</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Bidet</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Combination fixture</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Dishwasher, residential</td>
<td>2.75</td>
<td>8</td>
</tr>
<tr>
<td>Drinking fountain</td>
<td>0.75</td>
<td>8</td>
</tr>
<tr>
<td>Laundry tray</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Lavatory</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Shower</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Shower, temperature controlled</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Sillcock, hose bibb</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Sink, residential</td>
<td>2.5</td>
<td>8</td>
</tr>
<tr>
<td>Sink, service</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Urinal, valve</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Water closet, blow out, flushometer valve</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>Water closet, flushometer tank</td>
<td>1.6</td>
<td>15</td>
</tr>
<tr>
<td>Water closet, siphonic, flushometer valve</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td>Water closet, tank, close coupled</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Water closet, tank, one piece</td>
<td>6</td>
<td>20</td>
</tr>
</tbody>
</table>
(F) Materials:

A. General:

All materials used in potable water distribution systems will be specified on the extension plans and must meet the minimum requirements of the American Water Works Association (AWWA) and the National Sanitation Foundation (NSF) along with any additional requirements set forth below. Galvanized pipe, for example, is not acceptable for water mains.

Materials shall conform to the applicable standards of the associations and agencies listed below except as may be herein modified:

1. AWWA – American Water Works Association.
4. NSF – National Sanitation Foundation.

B. Cast iron pipe, fittings, and joints shall conform to ANSI Standard Specifications A21.1, A21.4, A21.6, (or A21.8), A21.10, and A21.11. All grey iron pipe shall conform to either ANSI Specification A21.6, latest revision, or ANSI Specification A21.8, latest revision, with thickness and outside diameter as specified in Table 6.1 or 6.2 and 8.1 and 8.2, respectively, for Class 150 pipe. Pipe shall be cement lined and coated inside and out with a bituminous material.

C. Fittings shall meet the applicable sections of ANSI Standard Specification A21.11, and shall be cement lined with coatings of bituminous material.

E. Ductile Iron Pipe shall conform to ANSI Standard Specifications A21.50, and A21.51, with wall thickness for pipe twelve (12) inches and smaller, Class 3, and for pipe larger than twelve (12) inches, Class 2, as specified in Table 6 ANSI Specification A21.50, latest revision. Pipe shall be cement lined and coated as noted above for cast iron.

F. PVC pipe shall conform to AWWA Standard C900-75.

G. Plastic tubing (for services) shall be Schedule 40 PVC conforming to NSF Standards No. 14, and 15, and ASTM D 2241.

H. Copper tubing, fitting, and valves shall be Type K conforming to AWWA Standard Specification C800.

I. Gate valves shall be iron body, bronze-mounted double disc, parallel or inclined seats, non-rising stem, two (2)-inch square nut operated, mechanical joint, or flanged ends type gate valves designed to meet the requirements of AWWA Specification C500, latest revision. Valves shall open to the left (counter-clockwise). Valves up to and including size twelve (12) inches shall have an “O” ring type pressure seal. Valves larger then size twelve (12) inches shall have adjustable stuffing boxes in accordance with the above AWWA Specification.

J. Butterfly valves used in mains six (6) inches through and above twenty-four (24) inches shall be manufactured in accordance with and meet the requirements of AWWA Standard C504-70. The valve bodies shall be made of cast iron and conform to ASTM Specification A126-Class B, or ASTM Specification A48-Class 40. The butterfly valves shall be factory tested in accordance with AWWA Standard C504, Leakage and Hydrostatic Tests. A certified test report shall be furnished showing the valves have met the requirements of the test.

K. Meters shall be as approved by GBPA and The G. B Utility Company and shall conform to AWWA Standards.

L. Concrete for non-structural use shall have a minimum twenty-eight (28)-day strength of two thousand (2,000) psi.

M. Valve boxes shall be cast iron and shall have the word “Water” or letter “W” cast in the cover.
(G) Construction

A. Installation of water mains shall conform to the applicable requirements of the following AWWA Standards:

1. Cast or ductile iron pipe – AWWA C600.

2. Other type pipes shall be installed in accordance to the recommendations of the manufacturer and in general conformance to AWWA C600.

B. In addition to requirements of the foregoing, pipe laid in rock shall be bedded in gravel or crushed rock not larger than one-half (1/2)-inch size. The gravel or crushed rock bed shall rise to the springline of the pipe.

C. Where pipe is to be laid in a filled marsh, mangrove swamp, or in similar areas, special installation conditions shall be obtained in writing from GBPA. Such installations, which may include but not be limited to, jacketing, embedment, and placing of other permissible materials will be required for the special environment in question.

D. Services. Small meters (not larger than one [1] inch) shall be located in meter boxes placed at two (2) feet centre offset from the property line. If there is an existing sidewalk, the meter box shall be set as close as feasible to the outer edge of the walk. Large meters shall be placed in concrete vaults (either traffic bearing or non-traffic bearing type depending on location) located in public ROW. All meters must have a by-pass.

Check valves must be installed at the water meter to prevent backflow into the GBPA Utility’s water main pipe.

Copper tubing service shall be installed with corporation stop at the main, or adaptor with isolation bushing if connected to galvanized fitting, and may be run straight-line to curb stop or meter yoke with stop.

For typical service connection details, see Standard Details Nos. WS 4.11, WS 4.12, and WS 4.13.
E. Other Requirements:

1. All mains shall be blocked to withstand an operating pressure of at least one hundred fifty (150) psi.

2. The minimum cover on all water mains for a residential street other than arterial shall be thirty (30) inches except for twelve (12)-inch diameter pipe and above; in which case the minimum cover shall be thirty-six (36) inches. Services that cross a street shall have eighteen (18) inches of cover and near side services shall have eighteen (18) inches of cover. (See General Detail 2.1, sheet 2 of 4, Utility Placement Within a Right-of-Way for Residential Streets.)

3. On all arterial streets the minimum cover on all water mains shall be thirty-six (36) inches or any greater amount necessary to ensure that the operating nuts and valves shall have clearance below the bottom of the valve box covers, except in cases where this is not possible and special permission has been granted. (See General Detail 2.1, sheet 4 of 4, Utility Placement Within a Right-of-Way for Arterial Streets.)

4. All lines shall be flushed and tested in accordance with AWWA Standard C600.

411 SEWERAGE AND SEWAGE TREATMENT

411.1 General:

(A) Sanitary sewers shall be installed where directed by GBPA or its designated Agent.

(B) Any system serving 25 or more persons shall be considered a public sewerage system.

(C) Sanitary sewerage shall be designed by a qualified engineer licensed by the GBPA who shall submit all drawings and necessary engineering data concerning the system to GBPA or its designated Agent for approval.
(D) Complete specifications shall be prepared with each sewerage system and each sewage treatment plant and where applicable, shall include, but not be limited to, the following:

411.2 Excavation and Backfill:

(A) Scope: The work included under this Section consists of clearing, excavating, grading, and backfilling required for the construction of all sewer lines, force mains, and structures as herein specified and as shown on the construction drawings.

(B) Clearing: Clearing for all sewer lines, force mains, air mains, and structures, shall be done within the working limits of the trenches and structure sites. Trees and utility poles within the working limits of the clearing shall be suitably protected and preserved.

(C) Excavation:

(a) General: The subdivider shall perform all excavation of every description and of whatever substances encountered to the dimensions and depth shown on the drawings, or as directed. All excavated materials not required for fill or backfill shall be removed or wasted as directed. All excavations shall be made by open cut. Trenches shall be kept as nearly vertical as possible, and, if required, shall be properly sheeted and braced. Where damage will result from with withdrawing sheeting, the sheeting shall be left in place. The subdivider shall take care that excavation does not extend below the specified elevations. All existing utilities, such as pipes, poles, and structures, shall be carefully supported and protected from injury, and in case of damage, they shall be restored without compensation. Therefore, also all utility lines encountered shall be removed and relaid.

(b) Trenches: In general, pipe trench shall be excavated to a depth that will ensure a minimum of twenty-four (24) inches of cover for cast iron pipe, unless otherwise shown on the drawings or as directed. Pipe trenches shall be excavated to provide a clearance on each side of the pipe of not less than eight (8) inches nor more than twelve (12) inches, shall be accurately excavated to grade and shall provide uniform support for pipes along their entire length. Excavation shall be made for bells of all pipes.
(c) Rock: Where solid rock occurs in the trench, it shall be excavated to a depth of at least four (4) inches below trench grade and then refilled to grade with select bedding material.

(d) Miscellaneous: Excavation for manholes and other accessories shall be sufficient to leave at least twelve (12) inches in the clear bottom their outer surfaces and the embankment or timber that may be used to protect them. Backfill of earth under manholes will not be permitted, but an excess excavation for these structures shall be filled with thoroughly compacted sand or gravel or with concrete.

(e) Shoring: The subdivider shall do all shoring required to perform and protect the excavation and as necessary for the safety of the employees.

(f) Drainage: The subdivider shall prevent the accumulation of water in the excavated areas, and shall remove by pumping or other means any water that accumulates in the excavation.

(g) Sheeting and Bracing: Where necessary, as aforementioned, the sides of the trenches and excavations for structures shall be supported by adequate sheeting and bracing. The subdivider shall be responsible for the sufficiency of all sheeting and bracing used, and for all damage to persons or property resulting from the improper quality, strength, placing, maintaining, or removing the same.

Where the material to be excavated is of such character or other, conditions are such as to render it necessary, the sheeting shall be closely driven and to such depth below the bottom of the structure as may be directed. Where adjacent structures or pipes may be damaged by the removal of sheeting, the subdivider shall not remove the sheeting, and they shall be responsible for all damages caused by the removal of the sheeting. All sheeting left in place shall be cut off at least two (2) feet below the surface of the ground.

(D) Backfilling:

A. For Trenches: Fill in pipe trenches shall not be placed until the pipe installation has been tested and approved. Trenches shall be backfilled with the excavated materials, free from large clods and stones, carefully deposited in layers not to exceed six (6) inches and thoroughly and
carefully rammed until enough fill has been placed to provide a cover of not less than one (1) foot (11 above pipe). The remainder of the backfill material may then be thrown in, and shall be moistened and tamped to ensure proper compaction. Whenever the trenches have not been properly filled, or if settlement occurs, they shall be refilled, compacted, smoothed off, and finally made to conform to the surfaces of the ground. Backfill in open trenches across the roadways or other areas which are to be paved, shall be made as specified above, except that the entire fill above the pipe shall be deposited in layers not to exceed six (6) inches in thickness, moistened, and compacted to density equal to or greater than that of the earth adjacent to the trench banks so that when backfilling is completed, the roadway paving can be placed immediately. Sand backfilling shall be inundated with water and vibrated or spaded to insure compaction.

B. For Structures: Selected material shall be used for all backfill. Trash shall not be allowed to accumulate in spaces to be backfilled, and this space shall be well cleared before backfill is placed. Backfilling around foundation walls shall be promptly accomplished, and shall be thoroughly compacted by hand tamping in layers of not more than six (6) inches or by puddling with water. Backfilling shall be brought to a suitable elevation above grade to provide for anticipated settlement and shrinkage.

C. The subdivider shall prevent the accumulation of water in both structural and trench excavation, and shall remove by pumping or by other means any water that accumulates in the excavation.

(E) Excavated Materials: In congested areas, such materials as cannot be stored adjacent to the trench or used immediately as backfill shall be removed to convenient places of storage. Excess materials and materials unsuitable for backfill shall be removed and disposed of immediately after backfill has been placed.

(F) Removal of Water: The subdivider shall provide all necessary pumps, under drains, and other means of removing water from trenches and other parts of the work. Before pipes are laid or structures are built, the trenches and excavations shall be from the water. The subdivider shall continue dewatering operations until the backfill has progressed to a sufficient depth over the pipe to prevent floatation or movement of the pipe in the trench.
(G) Change of Location of Pipes and Other Structures: In case it becomes necessary to cut, relocate, and/or restore water, gas pipes or service connections, electric conduits, or poles, the subdivider shall notify and make arrangements with the owner of the utility to cut and restore them. They shall cooperate with the utility owner and furnish such assistance as is needed to make the necessary changes.

(H) Barricade and Protection of Work: The subdivider shall protect their work throughout its length by the erection of suitable barricades and hand railings where required. They shall further indicate this work at night by the maintenance of suitable lights or flares, especially along or across (thoroughfares). Wherever it is necessary to cross a public walk, they shall provide a suitable safe walkway with hand railings. All utility access manholes, valves, fire hydrants, and letter boxes shall be kept accessible for use at all times. They shall also comply with all rules covering the protection of such work and the safety measures to be employed therein.

411.3 Pipe and Pipe Laying:

(A) Pipes for the various types of sewer lines may be of any materials as indicated herein, as shown on the drawings, or as directed by the GBPA. Only one type of pipe shall be used for any one continuous sewer line. Pipes shall be laid true to the grades shown on the drawings or as directed by the GBPA. Each section of pipe shall rest upon the pipe bed for the full length of its barrel with recesses excavated to accommodate bells and joints. Any pipe that has its grade or joint disturbed after laying shall be taken up and relaid. The interior of all pipe shall be thoroughly cleaned of all foreign matter before being lowered into the trench and shall be kept clean during laying operations by means of plugs and other approved methods. In all cases, water shall be kept out of the trench until the concrete encasement or cradle, where used, and material in the joints has hardened. At all times when work is not in progress, all open ends of pipes and fittings shall be securely closed to the satisfaction of the GBPA so that no trench water, earth, or other substances will enter the pipe or fittings. Any section of pipe already laid and found to be defective shall be taken up and replaced with new pipe.

(B) Service Connections:

A. Wye Type Service Connections - Service lines, where required, shall be connected to the sewer main by means of a wye filling with a branch of the same size as the service line. Branch of the wye fitting will be elevated as directed,
depending on the depth of the sewer main. An eighth bend shall be used to connect the service line at the wye branch.

B. Riser Type, Service Connection - The riser type service connection will be used where service lines from opposite sides of the ROW intersect the sewer main at the same point. This type of connection consists of a tee, riser pipe and a true wye with required eighth bends set at such elevations depending on the depth. Additional depth shall be that footage of riser barrel required when depth exceeds six (6) feet as shown on the Standard Details sheet of the plans.

C. Plugged Riser Type Connections - The service connections shall be the same as A or B above, except that plugs shall be installed in the true wye openings instead of the eighth bends.

D. Double Wye Branch Cleanout Assemblies - At the terminus of the service lines to which are connected more than one service, the subdivider shall furnish and install a double wye branch with clean-out plug as detailed on the drawings. The number and locations of these assemblies shall be as directed by the GBPA in the field.

E. Concrete Encasement - Any or all points in the sewer system where the cover and top of the pipe is less than one and eight-tenths (1-8/10) feet or where the sewer is less than one and one-half (1-1/2) feet, from a water main, the subdivider shall install concrete encasement under and around the pipe to the dimensions as detailed in the plans, and the concrete shall conform to the requirements of Section Concrete.

(C) Vitrified Clay Pipe for Gravity Lines:Pipe - Unless otherwise shown on the drawings, or specified, vitrified, clay pipe shall be "Standard Strength" and shall conform to Federal Specifications SS-P-361 or the latest revision thereof or amendment thereto.

A. Test Reports - Certified records of the tests made by the manufacturer or by a reliable commercial laboratory or by both, if required by the GBPA, shall be submitted with each shipment of pipe.

B. Pipe Inspections - All pipe will be inspected upon delivery and such as does not conform to the requirements of this covenant shall be rejected and must be immediately removed by the subdivider. The subdivider shall furnish
and provide all labor necessary to assist the GBPA in inspecting the material.

C. Basis of Rejection - The basis of rejection of pipe shall be as specified in Federal Specifications SS-P-361, as amended.

(D) Installation:

A. Pipe Laying: The bottom of the trench shall be shaped to give substantially uniform circumferential support to the lower one-third (1/3) of each pipe. Each pipe shall be inspected for defects prior to being lowered into the trench and shall be carefully cleaned both inside of the bell and outside the spigot. Pipe laying shall proceed upgrade with spigot ends pointing in the direction of the flow. If the maximum trench width specified in Section 404.2, is exceeded for any reason other than by order of the GBPA, the subdivider shall install at their own expense such concrete cradling, pipe encasement, or other bedding as may be required by the GBPA to support the load of the backfill. Pipe alignment shall conform to the requirements as set forth in Section 411.4, Sewer Inspection and Tests, of this Code.

B. Joints: The joints in the sewer lines shall be constructed as described below. All joints shall be watertight and any leaks or defects discovered shall be immediately repaired. Any pipe that has been disturbed after being laid shall be taken up, the joints cleaned, and the pipe properly relaid.

(E) New manholes: New manholes shall be constructed of brick with cast iron frames and covers as shown on the drawings. The invert channels shall be smooth and accurately shaped to a semi-circular bottom conforming to the inside of the adjacent sewer section. Inverts may be formed directly in the concrete of the manhole base, may be built up of brick and mortar, may consist of half-tile laid in the concrete base, or may be constructed by laying full section sewer pipe straight through the manhole and breaking out the top half after the base is constructed. Where directed by the GBPA, invert channels and manhole bottoms shall be shaped and smoothed with one to two channels cement mortar of proper consistency. Steep slopes outside the invert channels shall be avoided. Changes in the direction of the sewer and entering branch or branches shall have a true curve of as large a radius as possible.
A. Types of New Manholes:

1. A shallow type manhole shall be constructed at all locations shown where the excavation to grade line does not exceed four (4) feet.

2. For excavation deeper than four (4) feet to grade line, the standard type manhole shall be constructed.

3. Where the difference in elevation between the grade line of the outlet pipe and the grade line of the inlet place is greater than twenty-four (24) inches, a drop manhole shall be constructed.

B. Brick Manholes: Brick manholes shall be constructed of hard, common clay brick, meeting the requirements of Federal Specifications SS-B-656, laid up with one to two cement mortar to which may be added lime in the amount of not more than twenty-five (25) percent volume of cement. The outside and inside shall be plastered and troweled with one-half (1/2) inch of cement mortar as shown on the drawings.

C. Manhole Frames and Covers: Manhole frames and covers shall be in accordance with requirements shown on drawings. If made of cast iron they shall conform to Federal Specifications QQ-L-652, and shall be of good, tough, and even grain. They shall be smooth, free from scale, lumps, blisters and sand holes, and defects of every kind that unfit them for use for which they are intended. No plugging or filling will be allowed. The words "Sanitary Sewer" shall be cast in the cover so as to be plainly visible; the manhole frames and covers shall be so set that the top of the cover will be flush with the finished grade.

D. Pre-Cast Manhole: As an alternative, the subdivider may use a pre-cast reinforced concrete manhole, however, prior to any construction, the subdivider will submit shop drawings of the manufacturer to the GBPA for their approval.

411.4 Sewer Inspection and Tests:

(A) It is imperative that all sewers and manholes be built practically water-tight and that the subdivider must adhere rigidly to the
specifications for material and workmanship. All of the sewerage, where encountered, must be pumped for disposal and special care and attention must be paid to securing water-tight construction. After completion, the sewers, or sections thereof, will be tested and gauged and if infiltration is above allowable limits specified, the sewer will be rejected.

(B) Inspection: On completion of each block or section of sewer, or such other time as the GBPA may direct, the block or section is to be cleaned, tested, and inspected. All repairs shown necessary by the tests are to be made, broken, or cracked pipe replaced, all deposits removed and the sewers left true to line and grade as herein specified, or shown on the plans, entirely clean, free from lumps, etc., and ready for use. Each section of the sewer between manholes is to show from either end on examination, a full circle of light. Each manhole or other appurtenance to the system shall be of the specified size and form, be water-tight, neatly and substantially constructed, and with the top set permanently to exact position and grade.

(C) Limits of Infiltration and Methods of Testing: The allowable limit of groundwater infiltration for the entire system of new sewers or any one trunk, or interceptor, shall not exceed the following limits of infiltration rates for full acceptance.

No allowance of ground water infiltration will be allowed for six (6) inch house service line arterials.

Table 400.11
Allowable Infiltration

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Gal./24 hr. day/mile where invert is above elev. 0.00</th>
<th>Gal./24 hr. day/mile where invert is below elevation 0.00 and above -4.00</th>
<th>Gal./24 hr. day/mile where invert is below elev. -4.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 inch</td>
<td>5,000</td>
<td>9,000</td>
<td>13,000</td>
</tr>
<tr>
<td>10 inch</td>
<td>5,400</td>
<td>9,500</td>
<td>13,700</td>
</tr>
<tr>
<td>12 inch</td>
<td>5,800</td>
<td>10,000</td>
<td>14,600</td>
</tr>
<tr>
<td>15 inch</td>
<td>6,300</td>
<td>10,700</td>
<td>15,400</td>
</tr>
<tr>
<td>18 inch</td>
<td>6,800</td>
<td>11,500</td>
<td>16,400</td>
</tr>
<tr>
<td>21 inch</td>
<td>7,300</td>
<td>12,300</td>
<td>17,400</td>
</tr>
<tr>
<td>24 inch</td>
<td>7,800</td>
<td>13,000</td>
<td>18,500</td>
</tr>
<tr>
<td>30 inch</td>
<td>9,000</td>
<td>14,500</td>
<td>20,500</td>
</tr>
</tbody>
</table>
Table 400.11
Allowable Infiltration

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Gal./24 hr./mile where invert is above elev. 0.00</th>
<th>Gal./24 hr./mile where invert is below elevation 0.00 and above -4.00</th>
<th>Gal./24 hr./mile where invert is below elev. -4.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>36 inch</td>
<td>10,000</td>
<td>16,000</td>
<td>22,500</td>
</tr>
</tbody>
</table>

The test will be made by measuring the infiltrated flow of water over a measuring Weir set up in the invert of the sewer, a known distance from a temporary bulkhead or other limiting point of infiltration. After the sewer or sewers have been pumped out, and normal infiltration conditions prevail, tests shall be started. Tests shall be run continuously for a period of not less than three (3) hours with Weir readings taken at twenty (20)-minute intervals.

When infiltration occurs in excess of the specified amount, the defective pipe or joints shall be located and repaired. If the defective portions cannot be so located, the subdivider at their own expense shall remove and reconstruct as much of the original work as necessary to obtain a sewer within the allowable infiltration limits upon such retesting as necessary.

411.5 Material:

(A) All material used in construction of sanitary sewers shall meet the requirements of the following specifications listed in Table 400.12:

Table 400.12
Sanitary Sewer Specifications

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitrified Clay Salt Glazed Pipe</td>
<td>ASTM SPEC. C-13-54</td>
</tr>
<tr>
<td>(Extra Strength)</td>
<td>ASTM SPEC. C-200-55 T</td>
</tr>
<tr>
<td>PVC</td>
<td></td>
</tr>
<tr>
<td>(Extra Strength)</td>
<td>AWWA C-400T Class 150</td>
</tr>
<tr>
<td>Styrene Rubber Plastic Sewer Pipe</td>
<td>CS 228-61</td>
</tr>
<tr>
<td>Cast Iron Pipe</td>
<td>FEC. SPEC. WW-P-421A AWAA C-500</td>
</tr>
<tr>
<td>Valves</td>
<td>FED. SPEC. WW-V-58 TYPE II Class A</td>
</tr>
<tr>
<td>Concrete</td>
<td>See portions of Planning and Development Code addressing concrete</td>
</tr>
<tr>
<td>Brick</td>
<td>FED. SPEC. SS-B-656</td>
</tr>
<tr>
<td>Manhole Rings and Covers</td>
<td>ASTM A-48.41 Class 20</td>
</tr>
</tbody>
</table>
(B) All material specified for use in construction of sanitary sewer systems shall be subject to the approval of GBPA or its designated Agent.

411.6 Design:

(A) Analysis: The design analysis to determine the required capacities of sewers should consider the following factors:

(1) Maximum hourly quantity of domestic sewage.

(2) Additional maximum sewage or industrial wastes.

(3) Groundwater infiltration.

(B) New Systems: New sewerage systems shall be designed on the basis of an average per capita daily flow of not less than seventy-five (75) gallons of sewage. On this basis the submain and lateral sewers shall be designed with capacities when running full of not less than four times the average flow. Main, trunk, and outfall sewers shall have capacities under the same conditions of not less than 2.5 times the average flow. Special allowance should be made in each case for sewage or water from industrial plants.

(C) Unfavourable Conditions: The seventy-five (75) gallons per capita daily figure will often cover normal infiltration but an additional allowance should be made where favourable conditions exist.

(D) Miscellaneous Wastes: In general, industrial wastes from service station washracks, lubrication racks, and shop floor drains shall not be connected into the sanitary sewer system without pretreatment and preferably shall be disposed of separately. In general, caustic wastes and other offensive manufacturing wastes shall not be connected into the sanitary sewerage system without special study.

411.7 Sewer, Sizes, Slopes, Depths, and Velocity of Flow:

(A) Size: The minimum allowable size for any sewer other than house sewer connection shall be eight (8) inches in diameter.

(B) Slopes:

(1) All sewers shall be designed and constructed with hydraulic slopes sufficient to give mean velocities, when flowing full or half full, of not less than two (2) feet per second based on Kutter's or Manning's Formula. For eight (8)-inch to twenty-four (24)-inch sewers, velocities shall be
determined using a valve of "n" of thirteen-thousandths (0.013) for pipe in two (2)-foot to four (4)-foot lengths, an "n" of twelve-thousandths (0.012) for any smooth and durable pipe in five (5)-foot to ten (10)-foot lengths.

(2) It is important that the designer plan the system to deliver the sewage to the plant in the shortest practicable time to minimize septic sewage conditions. It is important that the available head be carefully conserved by careful analysis of the hydraulic properties.

(3) In general the following minimum grades shall be provided:

<table>
<thead>
<tr>
<th>Sewer Pipe Size (inches)</th>
<th>Minimum Grade (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-inch</td>
<td>0.40%</td>
</tr>
<tr>
<td>10-inch</td>
<td>0.28%</td>
</tr>
<tr>
<td>12-inch</td>
<td>0.22%</td>
</tr>
<tr>
<td>15-inch</td>
<td>0.15%</td>
</tr>
<tr>
<td>18-inch</td>
<td>0.12%</td>
</tr>
<tr>
<td>21-inch</td>
<td>0.10%</td>
</tr>
<tr>
<td>24-inch</td>
<td>0.08%</td>
</tr>
</tbody>
</table>

(C) Rate of Flow. It is recognized that under flat topographic conditions these minimum grades cannot be rigidly followed. In cases where considerable economy in design will be affected, minor schemes of the sewer system having lower grades will be considered, provided that the velocity at average flow rate is at least one and six-tenths (1.6) feet per second based on a hydraulic analysis of the system (including estimated average flow rates and velocities) that must be submitted with plans and specifications for approval. Exceptions to the minimum grades listed above should be proposed only where an adequate maintenance force is available to provide the extra sewer maintenance that inevitably will be necessary.

(D) Increasing Size: At manholes where the sewer is increased in size or at points where a smaller sewer connects into a larger sewer, the invert of the larger sewer shall be at such lower elevation to maintain the same energy gradient. To approximate this, it is
suggested that the eight-tenths (0.8) depth point of both sewers be placed at the same elevation.

(E) Alignment: Sewers up to and including twenty-four (24)-inch diameter size must be laid with uniform slope and alignment between manholes.

(F) Joints: Hot-poured bituminous or polyvinyl chloride joints are preferable especially where infiltration must be kept to a minimum and under conditions where displacement may occur or where root penetration may be a problem. Alternate joint material used for sewer joints shall have satisfactory records for preventing infiltration and entrance of roots.

(G) Infiltration and Exfiltration: Leakage outward, with the trench dry or the infiltration in the case of wet trenches, shall not be allowed to exceed a rate of ten thousand (10,000) gallons per mile per day for any section of sewer up to fifteen (15)-inch size. Special consideration may be given to leakage allowance for larger size pipes. For pressure pipe sewers, the leakage allowance in any section should not exceed a rate of two hundred (200) gallons per inch diameter per mile per day under a test head appropriate to the design conditions.

(H) Location: Sewers shall be located so as to be remote from public water supply wells, other water supply sources, and structures. Sewers shall be located at least twenty-five (25) feet from such installations and sewers within fifty (50) feet of such source of water supply shall be of PVC pipe with water tight joints.

(I) Water and Sewer Lines Shall Not Be Laid in the Same Trench: A lateral separation of at least six (6) feet, and in case of crossings, a vertical separation of not less than eighteen (18) inches shall be maintained. In the event this is impossible, special provisions should be made.

(J) Interconnection: No permanent physical connection between a public or private potable water supply system and a sewer system and a sewer, sewage treatment plant or appurtenances thereto that might conceivably permit the passage of any sewage or polluted water into the potable water supply will be permitted.

411.8 Manholes:

(A) Location: Manholes shall be installed at the end of each sewer; at every change in grade, size, or alignment; at all intersections; and at distances not greater than three hundred fifty (350) feet for
sewers of fifteen (15) inches diameter or less, and four hundred (400) feet for sewers eighteen (18) inches to thirty (30) inches. Greater spacing may be permitted in larger sewers and those carrying treated effluents.

(B) Drop Manholes: A drop pipe shall be provided for a sewer entering a manhole at an elevation of twenty-four (24) inches or more above the manhole channel invert. In cases where the elevation difference between the manhole invert and the incoming sewer invert is less than twenty-four (24) inches, the invert shall be filleted to create a channel that will prevent solids deposition in the manhole.

(C) Diameter: The minimum inside diameter of manholes shall be forty-two (42) inches; larger diameters are preferable.

(D) Materials and Watertightness: Manholes shall be of precast construction and shall be waterproofed on the exterior with plaster coatings, supplemented by a bituminous coating where groundwater conditions are unfavorable. Solid manhole covers are preferred to prevent flooding. Manholes should have cast iron rings and covers.

(E) Flow Channel: The manhole floor shall have a flow channel made to conform in shape and carrying capacity to that of the sewers.

411.9 Quantities of Sewage Flow

<table>
<thead>
<tr>
<th>Type of Establishment</th>
<th>Gallons per day per person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small dwellings and cottages</td>
<td>50</td>
</tr>
<tr>
<td>Large dwellings with numerous fixtures</td>
<td>75-100</td>
</tr>
<tr>
<td>Multiple family residences</td>
<td>50</td>
</tr>
<tr>
<td>Rooming houses</td>
<td>40</td>
</tr>
<tr>
<td>Boarding houses</td>
<td>50</td>
</tr>
<tr>
<td>Hotels with connecting baths</td>
<td>50</td>
</tr>
<tr>
<td>Hotels with all private baths (2 persons per room)</td>
<td>50</td>
</tr>
<tr>
<td>Restaurants (toilet and kitchen wastes per patron)</td>
<td>7-10</td>
</tr>
<tr>
<td>Restaurants (kitchen wastes per meal served)</td>
<td>2%-3</td>
</tr>
<tr>
<td>Kitchen wastes at hotels, camps, boarding houses, etc., serving 3 meals per day</td>
<td>7-10</td>
</tr>
</tbody>
</table>
## Table 400.14
Quantities of Sewage Flow

<table>
<thead>
<tr>
<th>Type of Establishment</th>
<th>Gallons per day per person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tourist camps or trailer parks with central bathhouse</td>
<td>35</td>
</tr>
<tr>
<td>Tourist camps or trailer parks with individual bath units</td>
<td>50</td>
</tr>
<tr>
<td>Resort camps (night and day) with limited plumbing</td>
<td>50</td>
</tr>
<tr>
<td>Luxury camps</td>
<td>50-75</td>
</tr>
<tr>
<td>Work or construction camps (semi-permanent)</td>
<td>50</td>
</tr>
<tr>
<td>Day schools without cafeterias, gymnasiums, or showers</td>
<td>8</td>
</tr>
<tr>
<td>Day schools with cafeterias, gymnasiums, and showers</td>
<td>20</td>
</tr>
<tr>
<td>Day schools with cafeterias but no gymnasiums or showers</td>
<td>12</td>
</tr>
<tr>
<td>Boarding schools</td>
<td>50-75</td>
</tr>
<tr>
<td>Day workers at schools and offices</td>
<td>15</td>
</tr>
<tr>
<td>Hospitals</td>
<td>100 - 200*</td>
</tr>
<tr>
<td>Public institutions other than hospitals</td>
<td>75-125</td>
</tr>
<tr>
<td>Factories (gallon per person per shift, exclusive of industrial wastes)</td>
<td>15-35</td>
</tr>
<tr>
<td>Public picnic parks (toilet wastes only), gallon per person</td>
<td>5</td>
</tr>
<tr>
<td>Picnic parks with bathhouse, showers, and flush toilets</td>
<td>10</td>
</tr>
<tr>
<td>Swimming pools and bathing places</td>
<td>10</td>
</tr>
<tr>
<td>Luxury residences and estates</td>
<td>75-100</td>
</tr>
<tr>
<td>Country clubs per resident member</td>
<td>75</td>
</tr>
<tr>
<td>Country clubs per member present</td>
<td>25-50</td>
</tr>
<tr>
<td>Business offices</td>
<td>15-35</td>
</tr>
</tbody>
</table>

* per bed

### 411.10 Sewage Pumping Stations:

(A) General:

(1) Care shall be taken to locate pumping stations and construct them in such manner that the stations will not be subject to flooding.

(2) Stations shall be located with an adequate clear zone around them to prevent odor or noise nuisances to habitated areas. Preferably outside of street ROWs.
(B) Pumps: Pumps shall be designed to give good performance for the service intended. Centrifugal pumps, either vertical or horizontal, may be used. Suction and discharge piping and pump openings of raw sewage pumps shall be at least four (4) inches in diameter. The pump shall be placed so that under normal operating conditions, they will operate under positive suction heads. Each pump shall have an individual intake, and the wet well design shall be such as to avoid turbulence near the intakes.

(1) Removal: Provision shall be made to facilitate removal of pumps and motors for periodic repair and/or replacement.

(2) Duplicate Units: Two or more pumps or ejectors are always desirable at sewage pumping stations. For very small installations a single unit maybe considered only if the station is designed to permit the installation of a future duplicate pump without any structural changes.

(3) Overflow: An overflow shall be incorporated in the design in cases where occasional discharge of sewage will not be unduly objectionable.

(4) Capacity:

(a) Where only two units are provided, each shall be capable of handling flows in excess of the anticipated maximum flow and they shall have the same capacity.

(b) Where three or more pumping units are provided, they shall be designed so that when the largest pumping unit is out of service, the remaining pumping units will have adequate capacity to handle the anticipated maximum flow.

(5) Ejectors Capacity:

(a) Where an ejector station is served by air from a storage tank to which the compressors discharge, the ejector pots shall have a capacity of not less than one hundred twenty-five (125) percent of the average flow so that the two pots combined can handle the estimated peak flow. This recommendation is predicted on the compressors being sufficiently large enough so that one compressor can furnish enough air to handle two hundred (200) percent of the average flow.
(b) An interlock shall be provided so that each pot shall discharge separately when fed by a common air supply.

(c) Where ejector stations are equipped with an individual compressor for each pot so that the pot will be out of service, each pot shall be designed to handle two hundred (200) percent of the average flow.

(6) Controls: The pumps and controls of pumping stations, and especially those stations operated as part of treatment works, shall be selected to operate at varying delivery rates to discharge sewage from the station to the treatment works, where feasible, at approximately the actual flow rates into the pumping station.

(7) Bar Racks: Readily accessible bar racks with clear openings not exceeding two (2) inches shall precede units handling raw sewage unless ejectors or pumping units of special type using integral screens are used. Where screens are located below, convenient facilities shall be provided for handling screenings.

(8) Force Mains: Force mains are generally PVC pipe. Under certain conditions other materials such as asbestos cement or concrete may be used. Minimum velocity in the force main shall be two and one-half (2-1/2) feet per second.

(9) Electric: Electrical fixtures in enclosed places where gas may accumulate.

(10) Float Tubes: Control float tubes shall be located as not to be unduly affected by flows into the wet well or by pump suction. Float tubes in dry wells shall extend high enough to prevent overflow. In small non-attended stations with multiple pumping units, a provision shall be made to automatically alternate the pumps in use.

(11) Valves: Gate valves shall be provided on suction and discharge lines of each pump. A check valve or equivalent shall be placed on each discharge line between the pump and the gate valve.

(12) Wet Wells: The effective capacity of the wet well, or utilized capacity, shall provide a holding period not to
exceed ten (10) minutes for the design average flow. The wet well floor shall have a minimum slope of 1 to 1 to the intake. Where operation continuity is important, consideration should be given to dividing the wet well into two sections, suitably interconnected, to facilitate repairs and cleaning.

(13) Auxiliary Power: Some approved standby power equipment shall be available except where a gravity overflow can be provided at an elevation so as to prevent excessive to prevent surcharge of sewers into a suitable emergency water body without the danger of backflow from the water body affecting operation. Two independent generating sources, or emergency pump drives, are preferred.

(14) Sewage Treatment Facilities: Provisions for treatment shall be covered in connection with all new sewer installations. The extent of treatment will depend upon local conditions, however, sedimentation will usually be the minimum degree of treatment considered for approval. In connection with extensions to existing sewer systems with inadequate sewage treatment facilities, consideration shall be given to providing additional treatment facilities.

411.11 Sewage Treatment:

(A) General: Where other methods of disposing of or treating sewage are not feasible, GBPA or its designated Agent may require a sewage treatment plant to be constructed.

(B) Design: Such plant shall be designed and constructed under the supervision of a qualified engineer licensed by the Grand Bahama Port Authority and shall conform to all the requirements of this Code.

(C) Land: When in the opinion of GBPA or its designated Agent, a sewage collection system and disposal plant is required, the subdivider shall reserve an adequate parcel of land within the tract for a treatment plant site.

(D) Cost: If the cost of such collection system and plant does not exceed thirty (30) percent of the cost of individual treatment when the subdivision is fully populated then the first phase of such collection system and plant shall be constructed by the subdivider.
Determination: GBPA or its designated Agent shall take into consideration the following factors in the determination of the necessity for a collection system and plant.

1. The population density shall be in excess of 18 persons per acre.

2. The extent in area of such population density.

3. The topography of the area.

4. The ultimate cost of the collection system and method of treatment as compared to other acceptable methods of treatment and/or disposal.

411.12 Type of Treatment:

(A) Septic Tanks: Due to possible contamination of the fresh water supply, septic tanks with drainfield by themselves will not be allowed. Septic tanks will be permitted with disposal wells of the type and size specified in this Code.

(B) Imhoff Tanks: Imhoff tanks will be considered for installations serving 2,000 persons or less where no industrial waste is anticipated.

(C) Type of Treatment: Any type of treatment based on sound engineering practice will be considered such as high and standard trickling filters, activated sludge process, complete aeration process, Griffith process, or others.

(D) Disinfection: All treatment plant reuse effluent shall be disinfected, preferably by chlorination.

(E) Basis of Design: Treatment plants shall be designed on the following criteria.

1. Population: Five (5) to ten (10) years expected 3.5 persons per house or equivalent.

2. Flow Rate:

   - 24-hour average = 75 gallon gpcd
   - 16-hour average = 125% 24-hour average
   - 4-hour average = 175% 24-hour average
   - Peak = 275% 24-hour average
   - 4-hour minimum = 40% 24-hour average

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(3) Five (5)-Day BOD: Not less than 200 ppm.

(4) Suspended Solids: Not less than 200 ppm.

412 ELECTRIC AND COMMUNICATION UTILITIES

412.1 General. All means of electric supply or use including but not limited to, generators, transmission lines, distribution lines, street lights, communication lines, traffic lights, alarm and signal systems, or any use whatsoever employing electricity shall conform to the requirements of this Code, the Canadian Electrical Code and the Building Code.

412.2 Location:

(A) Easements for overhead electric transmission and distribution lines shall, where practicable, be located in alleys in commercial or industrial districts and along the front lot lines in residential areas.

(B) Easements shall be required for utilities within streets, alleys, or other GBPA or public lands.

(C) Complete and accurate "as built" plans of all electric and communication utilities whether overhead or underground will be filed with the GBPA.

412.3 Operation: All electric supply systems or uses including any joint use shall be operated in a manner which conforms to accepted safety practices as set forth in this Building Code.
D. GRAND BAHAMA PORT AUTHORITY ROAD CONSTRUCTION DESIGN AND DETAILS
| 01 | CLEARING |
| 02 | EXCAVATION |
| 03 | SUB BASE |
| 04 | BASE |
| 05 | PRIME COAT |
| 06 | TACK COAT |
| 07 | BUTUMINOUS SURFACING |
| 08 | DOUBLE SEAL TREATMENT |
| 09 | DRAINAGE WELL AND CATCHPITS |
| 10 | CULVERTS |
| 11 | SIDEWALKS |
| 12 | KERB |
| 13 | LANDSCAPING |
| 14 | AS-BUILT SURVEY |
| 15 | OVERLAYING EXISTING ROADS |
The following guidelines shall be used for the construction of roads and pavements.

MATERIAL AND CONSTRUCTION STANDARDS

Construction standards and methods with stated tolerances are to be in accordance with FDOT – Standard Specifications for Road and Bridge Construction, or unless otherwise stated in the following sections.

01 CLEARING

The natural ground over which filling is to be placed shall be cleared of all loose boulders, grass, productive soil, bushes, trees, roots and other vegetation. No filling material shall be placed until all watercourses have been diverted or drained. All potholes or cavities’ discovered shall be opened up, filled and compacted before any filling takes place.

Approval from the Building & Development Services Department required prior to clearing.

02 EXCAVATION

Vegetation and topsoil shall be completely removed from the entire road reservation width, and ground excavated for the full width of the formation level or to depth as may be required to eliminate depressions, or soft-compacted areas. Trees, of minimum clear-trunk of 5-ft with clearance outside the edge of the shoulders, to be saved for beautification.

Approval from Building & Development Services Department required prior to removing any protected tree species.

03 SUB BASE

At sections to be reconstructed or where cutting is required, the existing formation shall be scarified to a depth of 6” below formation level.

The scarified material shall then be shaped and rough graded, watered and compacted after hard planning to achieve the required cross-fall a further rolling of any loose material shall be carried out until a smooth surface layer is achieved, except for verges. They shall be left with a rough surface to receive the subsequent base layer.
BASE

Base to be clean well graded limerock material passing a 2-inch mesh, applied in two layers of 4-inches, to achieve a minimum base thickness of 8-inches after compaction.

Moisture content of material will be manipulated with the required amount of wetting or drying of the full width and depth of the course to obtain compaction, to be $\pm 3\%$ of optimum moisture content.

Layers to be compacted on obtaining proper conditions of moisture to a minimum density of 100% of maximum density as determined by AASHTO T180, ASTM D1557. Areas located outside the travel lanes to be compacted to a minimum density of 98%, i.e. intersections, cul-de-sacs, hammerheads, etc…

04.1 Density Testing

Minimum of three density tests shall be performed on each section of final compaction or as determined by the Engineer for the development. Density shall be determined using the Nuclear Density Method, or Sand-Cone Method, and shall conform to ASTM standards or approved equivalent. Moisture density curves shall conform to ASTM D1557; sieve analyses to ASTM C136; and field densities to ASTM D2167 or to ASTM D2922.

A copy of the density test results to be forwarded to Building & Development Services of the Grand Bahama Port Authority Limited (GBPA), or review.

PRIME COAT

Prime coat used shall be a cutback asphalt or emulsified asphalt. Base course to be free of all organics, and shaped to the design cross-fall before the application of the prime coat.

Prime coat shall be applied uniformly over the full width of the carriageway to be paved.

TACK COAT

Tack coat to be used when an overlay is required.

The tack coat shall be undiluted asphalt grades RS-1 or RS-2 heated to a temperature of 140 to 180 degrees Fahrenheit.
Application shall be with an approved pressure distribution at the rate of 10-square yards per gallon of residual bitumen, over the width of the carriageway to be paved.

Care should be taken to prevent pooling of the emulsions, when used.

Tack coat shall be applied in advance of the bituminous mix to permit sufficient drying but not to lose adhesive properties.

Tack coat shall be free of traffic until bituminous layer has been laid.

07

BITUMINOUS SURFACING

The surface of the carriageway to be hot rolled asphalt as specified by Florida Department of Transportation Standard Specifications for Road and Bridge Construction 2001, section 331.

Bituminous surfacing shall be Type S-I or S-III asphaltic concrete, applied with approved plant in a single layer of minimum bituminous of 1½-inch when compacted. A single layer of 1 inch thickness may be used if permission is given by the Building Development Services Department of GBPA. Temperature during spreading of mix shall be within 25 degrees Fahrenheit of the established mix temperature.

Surfacing operation will cease during rainfall, or if water is covering carriageway to be surfaced.

Bituminous surfacing of type S-I or S-III shall be applied to all newly constructed roads in Freeport/Lucaya.

Roads in the un-subdivided area in the “PORT AREA” may be surfaced using a double seal treatment of primecoat, pea-rock and sandseal surface, or other suitable material subject to the approval by Building & Development Services. Double seal treatment to be placed as per Section 8. Surfacing roads with concrete is acceptable with concrete mix design submitted to and approved by the Building and Development Services of GBPA.

07.1 Compaction

Compaction will be carried out using a vibratory or static roller of 5 to 12 tons for seal rolling, with final rolling completed before pavement temperature is below 175 degrees Fahrenheit, to achieve required density.

Final rolling to be with an 8 to 12 ton steel roller after the seal rolling, with rolling completed before pavement temperatures is below 175 degrees Fahrenheit.
Rolling to be longitudinally, with the center joint pinched prior to rolling the remainder of the lane. Rolling to proceed across entire mat with 6-inches of overlap on each adjacent pass. Rolling speed to be slow enough to avoid displacement of the mix and until all roller marks are eliminated.

Bituminous surface to have a minimum density of 98% of maximum density as determined by AASHTO T180.

07.2 DENSITY TESTING

Density of the in-place asphalt shall be determined using either the Nuclear Density Method-use a nuclear density machine at ten random locations within the full width of the paved carriageway or intervals as determined by the Engineer of the development; or by determining the density of the cores.

Coring shall be carried out at random locations on the full width of the surfaced carriageway to determine thickness of bituminous surface, as determined by the Engineer of the development.

A copy of the density test results to be forwarded to Building & Development Services of GBPA for review.

08 DOUBLE SEAL TREATMENT

Double seal treatment is for application on Family Island roads ONLY.

Each of the following surface treatment layers shall be distributed by means of an approved mechanical spreader and drag broomed to achieve an even distribution. The surfaces shall be rolled with at least four passes of a 7 to 10 ton pneumatic tyred roller.

No surfacing shall commence until the finish base has been approved by the Engineer.

08.1 Prime Coat

Prime coat-basecourse shall be power broomed to sweep the surface clean of all dust and deleterious material. The RC-250 prime coat shall be applied to the base when it is dry or slightly damp.

Prime coat- RC-250 diluted 25% by volume with light (grade 1) diesel fuel shall be applied at a rate of 0.2 gallons per square yard, at a temperature between 140 degrees F and 180 degrees F, and at a spray bar
pressure of at least 40- pounds per square inch. It should then be allowed
to dry for not less than 48 hours without being disturbed by traffic.

08.2 PEA-ROCK SURFACE (1st Coat)

RC-250 shall be applied at a rate of 0.3 gallons per square yard, at a
temperature between 140 degrees F and 180 degrees F, and at a spray bar
pressure of at least 40- pounds per square inch, blinded with 3/8 inch
pea-gravel aggregate, at an application rate of 35 pounds per square yard,
and rolled as stipulated above.

08.3 SANDSEAL SURFACE (2nd Coat)

Second coat – After a period of not less than 48 hours, during which the
first coat has been kept free of traffic, the surface will be swept by a power
broom to remove all lose chippings and deleterious material. RC-250
shall be applied at a rate of 0.3 gallons per square yard, at a temperature
between 140 degrees F and 180 degrees F, and at a spray bar pressure of at
least 40- pounds per square inch, blinded with coarse, sharp sand, at an
application rate of 35 lb per square yard, or at a rate stipulated by the S.O,
and rolled as stipulated above.

08.4 SWEEPING

After a period of not less than 48 hours, during which the second coat has
been kept free of traffic, the surface will be swept by a power broom to
remove all loose chippings and deleterious material.

09 DRAINAGE WELLS AND CATCHPITS

Drainage wells to be constructed using an approved drilling contractor, with adequate
measures to retain spill water on site.
Well to have a minimum diameter of 9-inches and drilled to a minimum depth of 150-
ft, and verified by Inspector/Engineer of Building & Development Services of the
GBPA prior to installation of well casing.

Casings to be installed and grouted to a minimum depth of 40 ft below the fresh
water/ salt water interface. Building & Development Services of the GBPA to ensure
protection of the fresh water table, with an upstand of 6 –inches and covered with a
mesh basket.

Catchpits for the well head to be constructed with concrete of strength 3,000 psi,
poured in place, with a minimum dimensions of 2-ft width, 3-ft length, 2-ft depth.
Frame and covers for catchpit and wellheads to have a minimum load rating of H-20,
and to be of Neenah Foundry, U.S. Foundry or equivalent approved by Building &
Development Services of the GBPA.
Exhibit of typical drainage well and catchpit details are included in the Appendix F-B.

10 CULVERTS

Culverts shall be provided to connect catchpits, ponds or natural bodies of water, when construction of roadway impedes flow. Culverts to be sized to provide adequate flow, with a minimum diameter of 18-inches or equivalent surface area.

11 SIDEWALKS

Sidewalks may be provided on all roads, including cul-de-sacs.

Sidewalks to be constructed using asphalt concrete with concrete kerb or Portland concrete cement, having a minimum width of 6-ft and curb height of 6-inches.

Sidewalks to be recessed at accesses to provide a transition from edge of access to sidewalk.

Transition from sidewalk to recessed sidewalk shall be with a disabled ramp of minimum length 3-ft.

11.1 ASPHALT TYPE SIDEWALK

Asphalt sidewalks to be constructed as per Section 9.7-Bituminus Surfacing, with the construction of a concrete kerb as per Section 9.13-kerb.

11.2 CONCRETE TYPE SIDEWALK

Concrete sidewalks to be constructed by cast-in-place or slip form method. Cast-in-place includes preparation of sub-grade, supply and placing of fill materials, supply of materials and cast-in-place sidewalk and kerb, finishing, curing, and backfilling.

Concrete shall be to the following:
Type B concrete proportion normal density concrete to American Concrete Institute (ACI)-318, Chapter 4 to give the following mix:
Cement type 1 with a strength of 3,000 pounds per square inch at 28 days for one cylinder, using nominal coarse aggregate size ¾ inch, with a water/cement ratio max 0.55, and slump discharge of 4 inches, min 2 inches.
Reinforcing bars- new billet steel, grade 60, deformed bars to ASTM A153 or suitable fiber reinforcement approved by Building & Development Services.

Curing compound to ASTM-C309 Type 1-D Class B.

**Exhibit of a typical sidewalk details are included in the Appendix F-C.**

(A) **TESTING**

Minimum quality control test frequencies specified as follows are the minimum number required.

Cast 3 concrete cylinders for each comprehensive strength test, one cylinder for the 7 day test and two cylinders for the 28 day test.

One test for each section 0 to 600 linear feet of sidewalk and kerb.

Air content test one test per load or batch of concrete.

Perform slump test at the discretion of Engineer.

(B) **METHOD OF CONSTRUCTION**

Remove all deleterious substances at the sub-grade level and replace with approved fill material to 98% maximum density as per the Standard Proctor Compaction Test.

Haul excavated material unsuitable for use as fill and place in area for grass seeding as shown on the relevant drawings approved by the Building and Development Services of the GBPA.

Use straight, smooth, and clean metal or timber forms oiled with Parvelube #30 or approved alternative.

Place forms to line and elevation, and brace and stake firmly in place.

Forms to be wooden or approved equivalent for curved surfaces with radii less than 150-feet.

Place concrete in forms and consolidate in forms using mechanical vibrators.
Vibrate all kerbs with a poker type vibrator not exceeding 2-inches in diameter.

Place contraction joints ¼ inch wide and 2 inches deep every 10-ft.

Finish to be broom finish to provide even surface, avoiding excessive toweling.

Sidewalk and Kerb edges to be rounded.

Protect work until concrete is set.

Remove forms and apply curing compound immediately and uniformly using an approved pressurized sprayer.

Backfill to 2 inches below the top of kerb to allow for topsoil.

12 **KERB**

Kerb to be used at intersections, traffic islands, or asphalt and concrete sidewalks for delineation of edge of paved carriageway from unpaved areas, or transition from one elevated area to another, or for drainage as approved by Engineer for development.

Kerb to be cast-in-place, pre-cast, or slip-formed to provide a minimum height of 6-inches from the edge of paved carriageway.

Kerb construction and testing as per Section 9.11.2.

**Exhibit of a typical sidewalk details are included in the Appendix F-C.**

13 **LANDSCAPING**

Landscaping to include indigenous trees to the Bahamas as much as possible. No invasive species shall be permitted. Any existing invasive species shall be removed and destroyed.

All plants and trees shall be completely free of diseases and/or insect infestations. Tree guys shall be taut and all accessories in good condition as specified. All planting beds and tree saucers shall be freshly cultivated and free of all weeds and debris.

Imported topsoil: natural, fertile, friable, agriculture soil containing no less than of 6% organic material with pH value ranging from 5.9 to 7.0.
Fertilizing shall be with approved mechanical equipment. Spread to be 50% of fertilizer in one direction, then 50% at right angles. Apply 50/50 mix of 6.6.6 fertilizer/Milogomite mix at the combined rate of 1.0 lb/square yard, or as directed by the Engineer.

Grassing can be by seeding using an approved seed spreader after ground preparation and fertilizing. Fertilizer to be spread uniformly over the area to be seeded at a spread rate of 800 to 1000 pounds per acre, and mixed into the soil to a depth of 4-inches. Seed to be scattered uniformly over the area to be grassed, using Pensacola Bahia seed or equivalent. Water seeded area to proceed to after germination, to sustain growth until established.

Grassing by sodding using ground preparation and fertilizing as in this section. Sod to be placed on the entire area to be grassed, unless in drainage swales or ditches where sod is to be staggered. Water sodded area until established.

14 AS-BUILT SURVEY

A topographic survey to be conducted on completion of construction for the subdivision, to include the following:

- Roadway centerline bearing and distance
- Roadway centerline elevations at 100-ft stations (Profile Plan to be included)
- Swale (drainage ditch) centerline elevations at 100-ft stations
- Drainage wells, catchpits, and culvert locations with elevations
- Lot boundary elevations

15 OVERLAYING EXISTING ROADS

Consult with the Building & Development Services Department of the Grand Bahama Port Authority, Limited for general specifications; but such works must be carried out under the supervision of a qualified engineer.
Appendix FA
Appendix FB
Typical Drainage Well, Catchpit, Culvert Details
Typical Concrete Sidewalk Details

TOP VIEW OF CONCRETE SIDEWALK

SECTION THRU CONCRETE SIDEWALK

1% SLOPE

ROADWAY

EXPANSION JOINT

GRADED AREA

FRONT OF SIDEWALK

BACK OF SIDEWALK

ASPHALT ROAD SURFACE

THICK CONCRETE SLAB

PIVOT WALK WAY

WIRE RINFORCEMENT
Appendix FD
LUCAYA FREEPORT, BAHAMAS

BUILDING PERMIT

PERMIT BECOMES INVALID AFTER A PERIOD OF 180 DAYS WITHOUT RECORD OF CONSTRUCTION ACTIVITY.

DATE: XXX XX, XXX

OWNER: John Doe

ADDRESS: Legal Description

PERMIT NO: 000000

24 HOURS NOTICE MUST BE GIVEN FOR ALL INSPECTIONS

THIS CARD MUST BE PLACED IN A CONSPICUOUS LOCATION

LUCAYA FREEPORT, BAHAMAS
THE GRAND BAHAMA PORT AUTHORITY, LIMITED

OWNER: ____________________________

TELEPHONE CONTACT: ____________________________
P.O. BOX NUMBER: ____________________________

ARCHITECT/ENGINEER: ____________________________

TELEPHONE CONTACT: ____________________________
P.O. BOX NUMBER: ____________________________

LEGAL DESCRIPTION OF PROPERTY
LOT(S): ____________________ BLOCK(S): ____________________

SUBDIVISION: ____________________________

STREET ADDRESS: ____________________________

LOT SIZE(S): ____________________________

DESCRIPTION OF WORK
☐ NEW CONSTRUCTION ☐ ALTERATION ☐ DEMOLITION
☐ ADDITION ☐ REPAIR ☐ MOVEMENT

NO. OF STORIES: ____________________ TOTAL HEIGHT (ft.): ____________________

TOTAL AREA ALL FLOORS: (sq. ft.): ____________________

INTENDED USE: ____________________________

GENERAL TYPE OF CONSTRUCTION: ____________________________

I hereby make application for a BUILDING PERMIT:

Construction Cost: ____________________

Estim. Work Start: __________ Estim. Completion Date: __________

Signature of Applicant: ____________________ Date: __________

Title of Applicant: ____________________________

<table>
<thead>
<tr>
<th>WALL</th>
<th>LN. FT.</th>
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<tbody>
<tr>
<td>Fence</td>
<td>LN. FT.</td>
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<tr>
<td>Pool</td>
<td>SQ. FT.</td>
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<tr>
<td>Dock</td>
<td>SQ. FT.</td>
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<tr>
<td>Gazebo</td>
<td>SQ. FT.</td>
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FOR OFFICIAL USE ONLY

<table>
<thead>
<tr>
<th>TYPE OF PERMIT APPLICATION</th>
<th>FEE</th>
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</thead>
<tbody>
<tr>
<td>1) BASIC BUILDING</td>
<td></td>
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<td>2) MISC. STRUCTURES</td>
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<td>3) SWIMMING POOL</td>
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<td>4) FENCE OR WALL</td>
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<td>5) AWNING OR CANOPY</td>
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<td>6) ROOFING</td>
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<td>7) PAVING/LANDSCAPING</td>
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<td>9) WATER SYSTEM</td>
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<td>10) SANITARY SYSTEM</td>
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<td>11) DRAINAGE SYSTEM</td>
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<td>12) GAS SYSTEM</td>
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<td>14) VENTILATION</td>
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<td>15) AIR COND OR REFRIDG.</td>
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<td>16) HEATING EQUIPMENT</td>
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<td>17) ELEVATOR OR ESCAL.</td>
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<td>18) FIRE PROTECTION</td>
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<td>19) OTHER</td>
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<td>20) SERVICE</td>
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<td>21) CIRCUITS</td>
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<td>22) MOTORS</td>
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<td>23) GEN. OR TRANSF.</td>
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<td>24) OTHER</td>
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<td>27)</td>
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<td>28)</td>
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TOTAL FEE: $ ____________________

DEPOSIT: $ ____________________

BALANCE ON FEE: $ ____________________

BUILDING PERMIT REC'D BY: ____________________

DATE: ____________________
1. The minimum fee for any building permit shall be $50.00 (and this shall be the minimum non-returnable deposit required to process any application for a building permit.

2. The minimum fee for a building whose gross area of floor space is more than 500 S.F. is $100.00.

3. The non-returnable deposit required to process any application for a building permit is approximately 50% of the total building permit fee. This 50% deposit is required for all applications for building permit.

4. When work for which a permit is required is commenced prior to obtaining a permit, the permit applicant will be required to pay an additional fee of 100% of the usual permit fee established herein. The payment of the fee shall not relieve the applicant of other penalties established by law. The double fee requirements shall be applicable to all divisions of the Building Department.

5. A permit issued shall become invalid if the work authorized by it is not commenced, or is suspended for a period for 180 days following the last recorded inspection. The fee for the renewal of a building permit shall be approximately 50% of the initial building permit fee.

6. The building permit fee will be an aggregate of all the relevant disciplines involved in the application.

Please refer to Schedule of Permit Fees – obtainable from the Building & Development Services Department of the Grand Bahama Port Authority, Limited.
Appendix FE
THE GRAND BAHAMA PORT AUTHORITY, LIMITED

Structural

CONTRACTOR OF RECORD
(to be completed prior to 1st relevant inspection)

NAME OF PROJECT __________________________________________________________

LEGAL DESCRIPTION _______________________________________________________

STREET ADDRESS __________________________________________________________

OWNER ______________________________________________________________________

___________________________________________________________________________ Hereby states that this Company is licensed by the Grand Bahama Port Authority, Limited to operate as a

( ) GENERAL CONTRACTOR ( ) HVAC CONTRACTOR

( ) SUBCONTRACTOR ( ) ROOFING CONTRACTOR

( ) ELECTRICAL CONTRACTOR ( ) ROOF TRUSS MANUFACTURER

( ) PLUMBING CONTRACTOR ( ) ROAD AND PARKS BUILDER

It is further declared that__________________________________________________ is the official ______________________________ Contractor/Subcontractor of record for the above mentioned construction/maintenance project and this Company takes full responsibility to have all the necessary works executed to the standards within the guidelines set by the current Grand Bahama Port Authority Limited Building and Sanitary Code and the Town Planning Regulations.

If, for whatever reason, the contract between________________________ and the owner of this project is terminated before the completion of the necessary works, _____________ shall notify the Building Inspections Division of the Grand Bahama Port Authority Limited within seven days of the actual termination.

___________________________________________________________________________

_____________________________________________ CONTRACTOR/SUBCONTRACTOR

_____________________________________________ DATE

_____________________________________________ OWNER/AGENT/GENERAL CONTRACTOR
THE GRAND BAHAMA PORT AUTHORITY, LIMITED

Electrical

Permit Number

_______________________

CONTRACTOR OF RECORD
(to be completed prior to 1st relevant inspection)

NAME OF PROJECT ________________________________

LEGAL DESCRIPTION ________________________________

STREET ADDRESS ________________________________

OWNER ________________________________

______________________________________________ Hereby states that this Company is licensed by the Grand Bahama Port Authority, Limited to operate as a

( ) GENERAL CONTRACTOR ( ) HVAC CONTRACTOR

( ) SUBCONTRACTOR ( ) ROOFING CONTRACTOR

( ) ELECTRICAL CONTRACTOR ( ) ROOF TRUSS MANUFACTURER

( ) PLUMBING CONTRACTOR ( ) ROAD AND PARKS BUILDER

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If, for whatever reason, the contract between ________________________________ and the owner of this project is terminated before the completion of the necessary works, ________________________________ shall notify the Building Inspections Division of the Grand Bahama Port Authority Limited within seven days of the actual termination.

______________________________________________

CONTRACTOR/SUBCONTRACTOR

______________________________________________

DATE

______________________________________________

OWNER/AGENT/GENERAL CONTRACTOR
THE GRAND BAHAMA PORT AUTHORITY, LIMITED

Plumbing

Permit Number

CONTRACTOR OF RECORD

(to be completed prior to 1st relevant inspection)

NAME OF PROJECT

LEGAL DESCRIPTION

STREET ADDRESS

OWNER

Hereby states that this Company is licensed by the Grand Bahama Port Authority, Limited to operate as a

( ) GENERAL CONTRACTOR  ( ) HVAC CONTRACTOR

( ) SUBCONTRACTOR  ( ) ROOFING CONTRACTOR

( ) ELECTRICAL CONTRACTOR  ( ) ROOF TRUSS MANUFACTURER

( ) PLUMBING CONTRACTOR  ( ) ROAD AND PARKS BUILDER

It is further declared that ________________________________ is the official __________________________ Contractor/Subcontractor of record for the above mentioned construction/maintenance project and this Company takes full responsibility to have all the necessary works executed to the standards within the guidelines set by the current Grand Bahama Port Authority Limited Building and Sanitary Code and the Town Planning Regulations.

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CONTRACTOR/SUBCONTRACTOR

DATE

OWNER/AGENT/GENERAL CONTRACTOR
THE GRAND BAHAMA PORT AUTHORITY, LIMITED

HVAC

CONTRACTOR OF RECORD

(to be completed prior to 1st relevant inspection)

NAME OF PROJECT ____________________________________________________________
LEGAL DESCRIPTION _________________________________________________________
STREET ADDRESS ___________________________________________________________
OWNER ________________________________________________________________

______________________________ Hereby states that this Company is licensed by the Grand Bahama Port Authority, Limited to operate as a

( ) GENERAL CONTRACTOR   ( ) HVAC CONTRACTOR
( ) SUBCONTRACTOR        ( ) ROOFING CONTRACTOR
( ) ELECTRICAL CONTRACTOR ( ) ROOF TRUSS MANUFACTURER
( ) PLUMBING CONTRACTOR   ( ) ROAD AND PARKS BUILDER

It is further declared that ____________________________ is the official ____________________ Contractor/Subcontractor of record for the above
mentioned construction/maintenance project and this Company takes full responsibility to have all the necessary works executed to the standards within the guidelines set by the current Grand Bahama Port Authority Limited Building and Sanitary Code and the Town Planning Regulations.

If, for whatever reason, the contract between ___________________________ and the owner of this project is terminated before the completion of the necessary works, __________________ shall notify the Building Inspections Division of the Grand Bahama Port Authority Limited within seven days of the actual termination.

______________________________ CONTRACTOR/SUBCONTRACTOR

______________________________ DATE

______________________________ OWNER/AGENT/GENERAL CONTRACTOR
THE GRAND BAHAMA PORT AUTHORITY, LIMITED

Truss manufacturer

Permit Number

CONTRACTOR OF RECORD
(to be completed prior to 1st relevant inspection)

NAME OF PROJECT ________________________________

LEGAL DESCRIPTION ______________________________

STREET ADDRESS ________________________________

OWNER __________________________________________________________________

________________________________________________________________________

Hereby states that this Company is licensed by the Grand Bahama Port Authority, Limited to operate as a

( ) GENERAL CONTRACTOR ( ) HVAC CONTRACTOR

( ) SUBCONTRACTOR ( ) ROOFING CONTRACTOR

( ) ELECTRICAL CONTRACTOR ( ) ROOF TRUSS MANUFACTURER

( ) PLUMBING CONTRACTOR ( ) ROAD AND PARKS BUILDER

It is further declared that ________________________________ is the official ________________ Contractor/Subcontractor of record for the above mentioned construction/maintenance project and this Company takes full responsibility to have all the necessary works executed to the standards within the guidelines set by the current Grand Bahama Port Authority Limited Building and Sanitary Code and the Town Planning Regulations.

If, for whatever reason, the contract between ______________________ and the owner of this project is terminated before the completion of the necessary works, __________________ shall notify the Building Inspections Division of the Grand Bahama Port Authority Limited within seven days of the actual termination.

________________________________________________________________________

CONTRACTOR/SUBCONTRACTOR

DATE

OWNER/AGENT/GENERAL CONTRACTOR
THE GRAND BAHAMA PORT AUTHORITY, LIMITED

Drain Well

Permit Number

CONTRACTOR OF RECORD
(to be completed prior to 1st relevant inspection)

NAME OF PROJECT ____________________________________________

LEGAL DESCRIPTION _________________________________________

STREET ADDRESS __________________________________________

OWNER ____________________________________________________

__________________________________________________________ Hereby states that this Company is licensed by the Grand Bahama Port Authority, Limited to operate as a

( ) GENERAL CONTRACTOR   ( ) HVAC CONTRACTOR

( ) SUBCONTRACTOR     ( ) ROOFING CONTRACTOR

( ) ELECTRICAL CONTRACTOR   ( ) ROOF TRUSS MANUFACTURER

( ) PLUMBING CONTRACTOR   ( ) ROAD AND PARKS BUILDER

It is further declared that______________________________ is the official____________________________ Contractor/Subcontractor of record for the above mentioned construction/maintenance project and this Company takes full responsibility to have all the necessary works executed to the standards within the guidelines set by the current Grand Bahama Port Authority Limited Building and Sanitary Code and the Town Planning Regulations.

If, for whatever reason, the contract between________________________ and the owner of this project is terminated before the completion of the necessary works, ____________ shall notify the Building Inspections Division of the Grand Bahama Port Authority Limited within seven days of the actual termination.

________________________________________________________
CONTRACTOR/SUBCONTRACTOR

________________________________________________________
DATE

________________________________________________________
OWNER/AGENT/GENERAL CONTRACTOR
THE GRAND BAHAMA PORT AUTHORITY, LIMITED

Roads & Park Builder

Permit Number

CONTRACTOR OF RECORD
(to be completed prior to 1st relevant inspection)

NAME OF PROJECT

LEGAL DESCRIPTION

STREET ADDRESS

OWNER

Hereby states that this Company is licensed by the Grand Bahama Port Authority, Limited to operate as a

( ) GENERAL CONTRACTOR  ( ) HVAC CONTRACTOR

( ) SUBCONTRACTOR  ( ) ROOFING CONTRACTOR

( ) ELECTRICAL CONTRACTOR  ( ) ROOF TRUSS MANUFACTURER

( ) PLUMBING CONTRACTOR  ( ) ROAD AND PARKS BUILDER

It is further declared that____________________________________ is the official________________________ Contractor/Subcontractor of record for the above mentioned construction/maintenance project and this Company takes full responsibility to have all the necessary works executed to the standards within the guidelines set by the current Grand Bahama Port Authority Limited Building and Sanitary Code and the Town Planning Regulations.

If, for whatever reason, the contract between________________________ and the owner of this project is terminated before the completion of the necessary works, ____________ shall notify the Building Inspections Division of the Grand Bahama Port Authority Limited within seven days of the actual termination.

________________________________________
CONTRACTOR/SUBCONTRACTOR

________________________________________
DATE

________________________________________
OWNER/AGENT/GENERAL CONTRACTOR
NOTE: All construction debris must be removed from this site and other adjacent sites before final inspection.

Permit Number ____________________

STATEMENT OF RESPONSIBILITY
(To Be Completed Before Final Inspection)

Project: ___________________________ Date: ___________________________

Statement: These works have been executed to the standards and within the guidelines set by the Grand Bahama Port Authority Limited Building Code and Town Planning Regulations.

* General Contractor

______________________________
Signed ________________________

* Plumbing Contractor

______________________________
Signed ________________________

* Electrical Contractor

______________________________
Signed ________________________

* A/C Contractor

______________________________
Signed ________________________

* Truss Contractor

______________________________
Signed ________________________

* Pest Control Contractor

______________________________
Signed ________________________

* Septic Tank Manufacturer

______________________________
Signed ________________________

* Disposal Well Driller

______________________________
Signed ________________________

* L.P. Gas

______________________________
Signed ________________________

* Environmental

______________________________
Signed ________________________

* Fire Protection

______________________________
Signed ________________________

* Other

______________________________
Signed ________________________

Companies are to be Licensees of the Grand Bahama Port Authority Limited