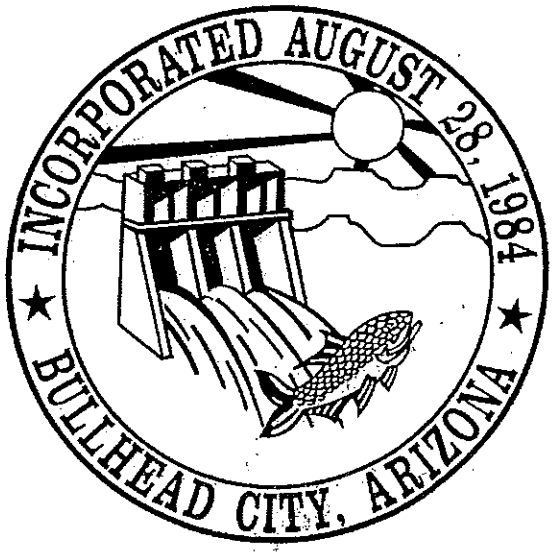
CITY OF BULLHEAD CITY

PROCEDURES MANUAL



Approved and Adopted by Council
April 21, 1998, Resolution No. 98R-056

CITY OF BULLHEAD
PROCEDURES MANUAL
PREFACE

The function of this Procedures Manual is to enumerate those engineering facts and requirements, design criteria and construction details that are promulgated by the Public Works Director and staff, which include the latest MAG Standard adoption and other resources. The Procedures Manual is a living, growing document which is designed to meet the needs of the development and construction community while providing good, maintainable construction for the City.

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PROCEDURES MANUAL

TABLE OF CONTENTS

STANDARD DETAILS

PUBLIC WORKS DEPARTMENT

CITY OF BULLHEAD CITY PROCEDURES MANUAL

APPROVED AND ADOPTED BY COUNCIL
APRIL 21, 1998, Resolution No. 98R-056

APRIL 1998

Mayor

City Manager

Acting Public Works Director

04/21/98
Date Approved by City Council

11.01 PURPOSE

The Procedures Manual is a living, growing document which is designed to meet the needs of the development and construction community, keeping a continuity for maintaining good quality construction.

11.02 POLICY

It is the policy to provide the best consistent standards and maintain a team effort to secure conformance throughout city development construction.

CITY OF BULLHEAD
PROCEDURES MANUAL
PREFACE

The function of this Procedures Manual is to enumerate those engineering facts and requirements, design criteria and construction details that are promulgated by the Public Works Director and staff, which include the latest MAG Standard adoption and other resources. The Procedures Manual is a living, growing document which is designed to meet the needs of the development and construction community while providing good, maintainable construction for the City.

HARRY HERMAN

Acting Public Works Director

CHAPTER 1

MISCELLANEOUS DRAWINGS

Sections:

Section 1.010 Miscellaneous Drawings - Submittal Requirements.

A. All miscellaneous drawings submitted to the Community Development Department for review by the Engineering Division, shall follow the standards of the items identified hereinbelow.

1. Proposed name of project and its location by address and/or legal description.

2. Name, address and phone number of owner.

3. Name, address and phone number of engineer and surveyor preparing the plan s.

4. Assessor's parcel number, legal description and address.

5. Location map with reference to adjacent streets, north arrow, date, title, etc.

6. Location of fences, wells, lakes, ditches, existing drainage courses, power lines, etc.

7. Location, widths and names of all platted street, utility rights-of-way of public record. Permanent structures to remain, including water wells and utility lines within or adjacent to the property.

8. By location map, indicate the existing zoning classification of the subject and adjacent properties.

9. By note, acreage of the subject parcel.

10. Boundaries of the property shall be fully dimensioned and the boundary monuments shown and identified.

11. All lettering shall be a minimum of 1/10" in height for ease of microfilming.

12. Endeavor to submit final versions in electronic media (.DXF and COGO files) tied to City, Mohave County, ADOT or USC&GS datum and control.

13. Approval blocks for the Owner, City Clerk, Community Development Director, City Engineer, Notaries, County Health, and/or City Council as applicable.

14. Plan revisions block and dates. Revisions should be clouded on the drawing itself, or with any other approved notations.

CHAPTER 2

SITE PLANS

Sections:

Section 2.010 Site Plans - Single Family, Multiple Family, Commercial, & Industrial Projects.

A. All site plans for single family, multiple family (duplex and above), commercial, industrial, and public works projects, submitted to the Community Development Department for review by the Engineering Division, shall follow the standards of the items identified hereinbelow. The drawings shall be readable, readily interpreted and sufficient for the purpose for which they were prepared.

1. Three copies of the site plan and improvement plans, drawn at a scale of one inch equals forty feet (1" = 40'), or adjusted to produce an overall drawing of twenty-four inches by thirty-six inches (24" x 36"). The drawings shall be readable, readily interpreted and sufficient for the purpose for which they were prepared.

2. Proposed name of project and its location by address and/or legal description.

3. Name, address and phone number of owner.

4. Name, address and phone number of engineer and surveyor preparing the plans.

5. Assessor's parcel number, legal description and address.

6. Location map with reference to adjacent streets, north arrow, date, title, etc.

7. Plans should reflect all existing bench marks in the area of the project and whether it is necessary to remove or destroy them due to new construction.

8. Topography by contours related to Mohave County, ADOT or NAVD (USC&GS) survey datum. Contour interval shall adequately reflect character and drainage of the land. (Projects that are one acre or less, that are not public works projects, may use an assumed datum and contours may be waived.)

9. Location of fences, wells, lakes, ditches, existing drainage courses, power lines, etc.

10. Location, widths and names of all platted street, utility rights-of-way of public record. Permanent structures to remain, including water wells and utility lines within or adjacent to the property.

11. By location map, indicate the existing zoning classification of the subject and adjacent properties.

12. Existing structures within fifty feet of the project. The map may show the approximate size, shape and location only.

13. Topography on the adjacent properties sufficient to indicate the drainage patterns.

14. By note, zoning and acreage of the subject tract and zoning of adjacent projects.

15. Boundaries of the property shall be fully dimensioned and the boundary monuments shown and identified.

16. Designation of all land to be dedicated or reserved for public use.

17. Method of sewage disposal and the layout of the sewer system. Indicate grade rates, manhole locations, clean-outs and depths. Laterals may be shown in the plan view only.

18. Layout of the water system. Indicate fire hydrants, valves, meter vaults, water line sizes and depths. Services may be shown in the plan view only. The owner shall also furnish evidence of adequate water supply in the form of written confirmation from the provider certificated to serve the area, which states they are able to provide water service to the

development.

Section 2.020 Grading Plans.

A. All single family, multiple family (duplex and above), commercial, industrial, and public works projects, submitted to the Community Development Department for review by the Engineering Division, shall submit a grading plan. See Chapter 3 of this manual for submission requirements.

Section 2.030 Hydrology Reports.

A. All single family, multiple family (duplex and above), commercial, industrial, and public works projects over one acre in area, submitted to the Community Development Department for review by the Engineering Division, shall submit a hydrology report in a separate bound folder. See Chapter 10 of this manual for submission requirements.

Section 2.040 Geotechnical and Soils Reports.

A. All single family, multiple family (duplex and above), commercial, industrial, and public works projects, submitted to the Community Development Department for review by the Engineering Division, shall submit a geotechnical and soils report. This requirement may be waived at the discretion of the Building Official or Engineering Division. See Chapter 12 of this Manual for submission requirements.

Section 2.050 General Information.

A. General Information

1. All design in the right-of-way or public easement must be in accordance with the Uniform Standard Specifications and Details published by the Maricopa Association of Governments, and as amended by the City.

2. Any new street right-of-way or utility easements must be coordinated with the City Engineer through the Community Development Department and shown on the final plat.

3. Developer must submit separate public utility plans, if an extension or

main or trunk line extension is needed. A letter from all utility companies approving proposed easements shall also be submitted with plans.

4. All water and sewer design must be per latest ADEQ requirements and submitted to them for approval, if appropriate, prior to City approval.

5. The developer is required to contact utility company for location of existing and proposed buried conduit or cable which must be shown on the plans to ensure that a minimum of conflicts will arise before approval can be given.

6. An approved set of drawings for the work being performed shall be available to the inspector for review at all times.

7. All improvements that encroach within the proposed retention basins and/or roadway parkways shall be performed in accordance with the applicable sections of this Manual. Show the location of all physical encroachments upon the boundaries of the property.

8. The plans are to include the proposed right-of-way improvements to include pavement, curbs, sidewalks, street lights (driveway illumination), signs, traffic signals, as appropriate. See Chapter 8 of this Manual for submission requirements.

Section 2.060 Notes.

A. All plans for single family, multiple family (duplex and above), commercial, industrial, and public works projects, submitted to the Community Development Department for review by the Engineering Division, shall include the notes listed below, as applicable.

1. The Contractor to notify the Engineering Division (520-763-9400, ext. 128) at least 24 hours in advance of any construction or inspection.

2. Staking that will be required and by whom.

3. Responsibility for the coordination of the relocation of power poles or other utilities, if necessary.

4. Contractor shall conform to "Arizona Blue Stake" laws. Blue Stake Center can be reached by calling 1-800-782-5348.

5. Different permits required and who is responsible for obtaining, including right-of-way, excavation and dirt moving permits.

6. The contractor to adjust all valves, manholes, clean-outs, etc., to finish grade per standard details.

7. Back fill and compaction within City rights-of-way to be in accordance with the applicable sections of this Manual.

8. Contractor to comply with the provisions for traffic control and barricading as per the Manual on Uniform Traffic Control Devices (MUTCD), for work in the right-of-way.

9. Underground utility owners to be contacted for their utility locations (include the telephone number), prior to any digging.

10. The control of dust.

Section 2.070 Certifications.

A. All plans for single family, multiple family (duplex and above), commercial, industrial, and public works projects, submitted to the Community Development Department for review by the Engineering Division, shall include the certifications listed below, as applicable.

1. I state to the best of my knowledge, information and belief, that the boundary of the 100 year floodplain and the zone designations shown on the plan and on the approved grading for this plan are shown accurately and that the finished floor elevations shown in the flood zone are (1) one foot above the regulatory base flood elevation according to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM).

ENGINEERING FIRM: _____
ENGINEER'S NAME: _____
TITLE: _____
SIGNATURE: _____
DATE: _____ AFFIX SEAL

2. All dry wells shown on this project shall be maintained by the owners and are to be replaced by the owners when they cease to drain the surface water in a thirty-six hour period. Regular maintenance of the dry well silting chamber is required to achieve the best operation of the dry well. Proof of registration with ADEQ is required prior to issuance of a Certificate of Occupancy.

CHAPTER 3

GRADING PLANS

Sections:

Section 3.010 Grading Plans - Single Family, Multiple Family, Commercial, & Industrial Projects.

A. All grading plans for single family, multiple family, commercial and industrial projects, submitted to the Community Development Department for review by the Engineering Division, shall follow the standards of the items listed below. A single family lot in a platted subdivision or a lot 1 acre or less will not be required to submit hydrology, geotechnical or soil reports.

1. Two copies of the grading plan drawn at a scale of forty feet equals one inch (40' = 1"), or adjusted to produce an overall drawing of twenty-four inches by thirty-six inches (24" x 36"). The drawings shall be readable, readily interpreted and sufficient for the purpose for which they were prepared.

2. Proposed name of project and its location by section, township and range, referenced by dimension and bearing to a section corner or quarter section corner, or referenced to appropriate street right-of-way centerline or other approved monumentation.

3. Location map.

4. Small scale subdivision and sheet index map, if applicable.

5. Name, address and phone number of owner.

6. Name, address and phone number of engineer and surveyor preparing the plans.

7. Topography by contours related to City, Mohave County, ADOT or USC&GS survey datum. Contour interval shall adequately reflect character and drainage of the land.

8. Location of fences, wells, lakes, ditches, power lines, etc. Location and extent of areas subject to inundation, and indicate frequency, etc. for properties within the FEMA floodplain.

9. Location, widths and names of all rights-of-way, public utility easements or other easements of public record. Permanent structures to remain, including water wells and utility lines within or adjacent to the property.

10. Name, book and page number of any recorded adjacent subdivision having common boundary with the property.

11. By note, acreage of the subject property.

12. All existing bench marks in the area of the project and whether it is necessary to remove or destroy them due to new construction. Notify the public works inspection division for reestablishment of same.

13. All bench marks used on this project. Any project submitted to the City of Bullhead City for review must use USGS, Mohave County or ADOT datum. Single lots less than 1/2 acre may use assumed datum, if out of floodplain.

14. Elevations referenced to mean sea level at each lot corner, or other adequate controlling grading.

15. Existing direction of natural drainage and any existing channels or washes will be shown on the plan.

16. Proposed drainage system to carry off-site flows, including point of discharge from property.

17. Finished elevations at lot corners, pad and structures, and direction of surface drainage after grading. A typical lot may be used for details, if applicable.

18. Identify the flood hazard area and elevation of the base flood, if

applicable.

19. Limiting dimensions or finished contours to be achieved by the grading, and proposed drainage channels and related constructions.

20. Detailed plans of all surface and subsurface drainage devices, wall, cribbing, dams and other protective devices to be constructed with, or as a part of, the proposed work together with a map showing the drainage area the estimated run off of the area served by any drains.

21. Location of any buildings or structures on the property where the work is to be performed and the location of any buildings or structures on land of adjacent owners which are within fifteen feet of the property or which may be affected by the proposed grading operations.

Section 3.020 Hydrology Reports.

A. Improvement plans for all single family, multiple family, commercial and industrial projects, submitted to the Community Development Department for review by the Engineering Division, shall include a hydrology report. See Chapter 10 of this Manual for submission requirements.

Section 3.030 Geotechnical & Soils Reports.

A. Improvement plans for all single family, multiple family, commercial and industrial projects, submitted to the Community Development Department for review by the Engineering Division, shall include a geotechnical and soils report. See Chapter 12 of this Manual for submission requirements.

Section 3.040 Cuts.

A. Unless otherwise recommended in the approved soils engineering and/or engineering geology report, cuts shall conform to the following:

1. Cut slopes shall not be steeper than two horizontal to one vertical.

2. If such cuts exceed three feet at any time during construction activity on the property, specific measures shall be employed to assure that such excavations are protected from public encroachment. Said measures shall be noted on the grading plans and approved by the Building Official. These measures may include:

a. Physical barriers, including berms, temporary fencing or other suitable obstruction.

b. Warning lights, signs or banners, which shall clearly indicate the danger to trespassers of all ages.

c. Where possible, stable trench coverings.

3. Drainage and terracing shall be provided on the plans as required by UBC Appendix, Chapter 70-Grading & Excavation, latest edition, as adopted by the City.

Section 3.050 Fills.

A. Unless otherwise recommended in the approved soils report, the plans and specifications for fills shall conform to the provisions of this section. In the absence of an approved soils report, these provisions may be waived by the Building Official for minor fills not intended to support structures.

1. Fill slopes shall not be steeper than two horizontal to one vertical.

2. The ground surface shall be prepared to receive fill by removing vegetation, noncomplying fill, topsoil and other unsuitable materials, scarifying to provide a bond with the new fill, and where slopes are steeper than five to one and the height is greater than five feet, by benching into sound bedrock or other competent materials as determined by the soils engineer.

3. The bench under the toe of a fill on a slope steeper than five to one shall be at least ten feet wide. The area beyond the toe shall be sloped for sheet overflow or a paved drain shall be provided.

4. Where fill is to be placed over a cut, the bench under the toe of fill shall be at least ten feet wide, but the cut must be made before placing fill and approved by the soils engineer as a suitable foundation for fill. Unsuitable soil is soil which, in the opinion of the Building Official or the soils engineer, is not competent to support other soil or fill, to support structures or to satisfactorily perform the other functions for which the soil is intended.

5. The specifications must indicate that detrimental amounts of organic material shall not be permitted in fills. Except as permitted by the Building Official, no rock or similar irreducible material with a maximum

dimension greater than twelve inches shall be buried or placed in fills.

6. All fills shall be compacted to minimum of ninety percent of maximum density as determined by UBC (under pavement ninety-five percent [95%]). Field density shall be determined in accordance with UBC as adopted by the City, or equivalent, as approved by the Building Official.

7. Drainage and terracing shall be provided and the area above fill slopes and the surfaces of terraces shall be graded and placed as required by the UBC,Appendix, Chapter 70-Grading & Excavation, latest edition, as adopted by the City.

8. Grading in retention basins is also to be in accordance with the additional requirements contained in Chapters 9 and 10 of this Manual.

Section 3.060 General Information - Single Family, Multiple Family, Commercial, & Industrial Projects.

A. General Information

1. All designs must be in accordance with the Uniform Standard Specifications and Details published by the Maricopa Association of Governments, latest edition, as amended by the City.

2. The developer is required to contact the utility companies for location of existing and proposed buried conduit or cable which must be shown on plans to ensure that no conflicts arise before approval can be given. Conflicts that arise shall be the responsibility of the developer.

3. Any contractor found working on a project without an official set of stamped, approved drawings by the Community Development Department, shall be issued a stop work order until further notice.

4. If fill is to be transported off site, the name and address of the property owner where the fill is to be placed will be required along with evidence of permission from that property owner. A grading permit will be required for the export or import of materials.

5. A statement from the property owner or agent assuming full responsibility for the performance of the operation and an assurance that other public and private property shall be adequately protected.

6. The plans and permits for all excavation and grading operations of any scope or magnitude conducted within the city limits, whether on public or private land, shall show provisions for the control of dust during such operations. The permittee shall also leave the property in a condition that shall prevent dust from arising.

7. The plans must provide for protection against erosion and run off generated maintenance problems.

8. All subdivision projects located in areas zoned R1S, may provide grading for building pads, drive accesses and 30% of the remaining lot.

Section 3.070 Notes.

A. All grading plans for single family, multiple family, commercial and industrial projects, submitted to the Community Development Department for review by the Engineering Division, shall include notes which address the items listed below, as applicable.

1. If details are shown, indicate to which sheet they refer.

2. Engineer's seal and stamp of approval on each sheet.

3. Notification of the public works inspection division at least 48 hours in advance of any construction or inspection.

4. Staking that will be required and by whom. Contractor shall provide fill/cut sheets from the surveyor staking the project.

5. Responsibility for the coordination of the relocation of power poles or other utilities, if applicable.

6. Contractor shall conform to "Arizona Blue Stake" laws. Blue Stake Center can be reached by calling 1-800-782-5348.

7. Permits required and who is responsible for obtaining, including right-of-way permits.

8. Contractor to adjust all valves, manholes, clean-outs, etc., both new and old to finish grade per standard details.

9. Back-fill and compaction within Bullhead City right-of-way to be in accordance with the latest Mohave County Special Provisions for

installation of underground utilities." Specify "mechanical compaction only" in maximum compacted six-inch lifts.

10. Contractor to comply with the provisions for traffic control and barricading as per the Manual on Uniform Traffic Control Devices (MUTCD).

11. Underground utility owners to be contacted for their utility locations (include the telephone number), prior to any digging.

12. All improvements within the public rights-of-way to be in accordance with the latest Procedures Manual.

13. The control of dust.

14. Contractor is advised that an excavation and dirt moving permit is required by the City. It is the responsibility of the contractor to obtain this permit and comply with its requirements.

15. Fences, retaining walls or toe of slopes will not extend into any easement or right-of-way.

Section 3.080 Certifications.

H. All grading plans for single family, multiple family, commercial and industrial projects, submitted to the Community Development Department for review by the Engineering Division, shall include the certifications listed below, as applicable.

1. I certify to the best of my knowledge, information and belief, that the boundary of the 100 year floodplain and the zone designations shown on the plat and on the approved grading for this subdivision are shown accurately, and that the finished floor elevations shown for each lot in the flood zone are (1) one foot above the regulatory base flood elevation according to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM).

ENGINEERING FIRM: _____
ENGINEER'S NAME: _____
TITLE: _____
SIGNATURE: _____
DATE: _____ AFFIX SEAL

CHAPTER 4

LAND SPLIT MAPS

Sections:

Section 4.010 Land Split Maps - Submittal Requirements.

A. All land split maps submitted to the Community Development Department for review by the Engineering Division, shall follow the standards of the items listed below.

1. Application form and filing fee.

2. Title report dated not more than thirty days prior to submittal.

3. Three copies of the land split map and a mylar copy (submit mylar copy with original signatures prior to signing of final approval) of the land split map (18" X 24"). Allow 2 inches on the left for binding with the 24 inch side being the top of the sheet.

4. Title the map, "City of Bullhead City Land Split Map (add case number)." Case number to be assigned by Community Development Department staff during the review process.

5. Legal description of the property.

6. Location and description of existing and proposed monuments to which all bearings, dimensions, angles and similar data shall be referenced. Such data shall be tied to the existing lines of record.

7. Boundaries of the property fully balanced and closed showing all bearing and distances (in feet and decimals therefore) determined by an accurate survey in the field, prior to approval by the Community Development Department.

8. By note or a legend, identification of any symbols used on the map.

9. Bearing and dimensions of all parcel lines with each parcel identified by

letter and indicating the net area in square feet (or acres) of each parcel, as appropriate.

10. Name, course, length and width of existing and proposed street dedications.

11. Course, length and width of existing and proposed private access, utility, public service and drainage easements.

12. The identification of adjacent subdivisions and land split maps by record data.

13. Flood area delineation based on the flood insurance rate map. Including a statement that "The line that is shown is a projection of the FIRM and may not reflect actual field conditions.", if applicable.

14. The location of existing structures on the property.

15. A note stating that there are no visible encroachments except as shown on this plat.

Section 4.020 Land Split Maps - Paragraph Requirements.

A. Paragraphs legally setting forth the items listed below shall be included on all maps, as applicable.

1. Owner's certificate.

2. Acknowledgment.

3. Surveyor's certificate and engineer's certificate.

4. Certificate of approval for the Community Development Director and City Engineer's signatures.

5. Recorder's certificate.

6. City acceptance certification of dedications of roadways and/or easements.

CHAPTER 5

SPECIFIC PLANS

Sections:

Section 5.010 Specific Plans - Submittal Requirements.

A. All specific plans submitted to the Community Development Department for review by the Engineering Division, shall follow the standards of the items listed below.

1. Fifteen copies of the specific plan. Plan to be drawn at a scale of one inch equals forty feet (1" = 40'), or adjusted to produce an overall drawing of twenty-four inches by thirty-six inches (24" X 36"). The drawings shall be readable, readily interpreted and sufficient for the purpose for which they were prepared.

2. Proposed name of subdivision and its location by section, township and range, referenced by dimension and bearing to a quarter section corner or section corner.

3. Name, address and phone number of subdivider.

4. Name, address and phone number of engineer and surveyor preparing the plans.

5. Show the assessor's parcel number, legal description and address.

6. Identification of the proposed phases of development.

7. Location map, with reference to main arteries, etc., a title scale, date and north arrow.

8. A memorandum on the plans showing the total area of the subdivision and showing the area of each lot to the nearest hundredth of an acre, if

greater than one acre, or showing area in square feet if less than one acre. Said information shall also include the areas of the parcels (common areas, etc.), including private streets, which may be taxed as real property.

9. General location and size of any school sites, parks, open space, or other land to be dedicated or reserved for public use.

10. Topography by contours or spot elevations related to Mohave County, ADOT or USC&GS survey datum. Contour interval shall adequately reflect character and drainage of the land.

11. Location of fences, wells, lakes, ditches, existing drainage courses, power lines, etc. Location and extent of areas subject to inundation; indicate frequency, direction of flow, etc.

12. Location, widths and names of all platted streets, and utility rights-of-way of public record. Permanent structures to remain, including water wells and utility lines within or adjacent to property.

13. Name, book and page number of any recorded adjacent subdivision having common boundary with tract.

14. By location map, zoning and acreage of subject and adjacent tracts. Map shall show existing structures within 300 feet of project.

15. Existing and proposed land uses by parcel, including recommended zoning, density and number of units for each. Density is computed for each separate land use by parcel within a specific plan according to the total acreage available within that particular parcel whether developable or not, and the density established in the City's zoning ordinance.

16. Boundaries of project to be subdivided shall be fully dimensioned and the boundary monuments shown and identified.

17. Show layout of connections to adjacent properties, proposed streets and alleys, giving widths, and proposed names.

18. Number each lot individually and give total number of lots.

19. Note addressing the method of sewage disposal and the name of the proposed provider.

20. Note addressing the method of water service and the name of the proposed provider.

Section 5.020 Hydrology Reports.

A. All specific plans submitted to the Community Development Department for review by the Engineering Division, shall include a hydrology report. See Chapter 10 of this Manual for submission requirements.

Section 5.030 Geotechnical & Soils Reports.

A. All specific plans submitted to the Community Development Department for review by the Engineering Division, shall include a geotechnical and soils report. See Chapter 12 of this Manual for submission requirements.

Section 5.040 Traffic Impact Analysis.

A. All specific plans submitted to the Community Development Department for review by the Engineering Division, shall include a traffic impact analysis. Said report shall include the information listed below.

1. The following Arizona Department of Transportation Trip Generation Intensity Factors shall be used as applicable, to determine the number of vehicle trips anticipated:

USE	FACTOR
Single Family Residential	10.0 trip/unit
Multiple Family Residential	6.8 trips/unit
Mobile Home Parks	5.9 trips/unit
Condominiums	7.2 trips/unit
Shopping Center	39.9 trips/1000 GFA*
Retail	75.2 trips/1000 GFA*
Offices	13.8 trips/1000 GFA*
Industrial	5.7 trips/1000 GFA

* Gross Floor Area.

2. A current traffic impact study (within the past 6 months) shall be required for conditional use permit applications, rezoning applications, and/or other developments that will produce 100 or more site generated peak hour trips based on the Institute of Transportations Engineers (ITE) Trip Generation manual (latest edition).

   A. Typical developments which would meet this requirement would be:

Light Industrial	≥	93,000 sf
Heavy Industrial	≥	145,000 sf
Fast Food Restaurant	≥	950 sf
Restaurant	≥	3,200 sf
Bank	≥	1,950 sf
Hotel/Motel	≥	132 rooms
Apartment	≥	100 dwelling units
Condo/Townhouse	≥	100 dwelling units
Mobile Home Park	≥	100 dwelling units
Single Family	≥	100 dwelling units
Schools	≥	350 students
Office	≥	37,000 sf

3. All Traffic Impact Studies required by this standard shall follow the guidelines set forth in the latest edition of the Traffic Access and Impact Studies for Site Development as published by the Institute of Transportation Engineers.

4. The traffic impact analysis shall be prepared by a professional registrant specializing in the field of Traffic Engineering.

5. The traffic impact analysis shall be used to determine whether the existing roadway network in the area of the proposed development will be able to handle the existing traffic plus the additional traffic that the subject development will generate.

6. The traffic impact analysis of the project development area shall contain sufficient information to adequately address the items listed below:

   a. Existing and proposed land uses.

   b. General street layout, including location, width and proposed names of public streets.

c. Connections to adjoining platted or proposed tracts and existing or proposed thoroughfares.

d. Trip generation, directional distribution, traffic assignment, capacity analysis.

e. Recommended solutions and improvements.

CHAPTER 6

PRELIMINARY PLATS

Sections:

Section 6.010 Preliminary Plats - Submittal Requirements

A. All preliminary plats submitted to the Community Development Department for review by the Engineering Division, shall follow the standards of the items listed below.

1. Fifteen copies of the preliminary plat. Plan to be drawn at a scale of one inch equals forty feet (1" = 40'), or adjusted to produce an overall drawing of twenty-four inches by thirty-six inches (24" X 36"). The drawings shall be readable, readily interpreted and sufficient for the purpose for which they were prepared.

2. Proposed name of subdivision and its location by section, township and range, referenced by dimension and bearing to a quarter section corner or section corner.

3. Name, address and phone number of subdivider.

4. Name, address and phone number of engineer and surveyor preparing the plans.

5. Show the assessor's parcel number, legal description and address.

6. Identification of the proposed phases of development.

7. Location map, with reference to main arteries, etc., a title scale, date and north arrow.

8. A memorandum on the plans showing the total area of the subdivision and showing the area of each lot to the nearest hundredth of an acre, if

greater than one acre, or showing area in square feet if less than one acre. Said information shall also include the areas of the parcels (common areas, etc.), including private streets, which may be taxed as real property.

9. General location and size of any school sites, parks, open space, or other land to be dedicated or reserved for public use.

10. Topography by contours or spot elevations related to Mohave County, ADOT or USC&GS survey datum. Contour interval shall adequately reflect character and drainage of the land.

11. Location of fences, wells, lakes, ditches, existing drainage courses, power lines, etc. Location and extent of areas subject to inundation; indicate frequency, direction of flow, etc.

12. Location, widths and names of all platted streets, and utility rights-of-way of public record. Permanent structures to remain, including water wells and utility lines within or adjacent to property.

13. Name, book and page number of any recorded adjacent subdivision having common boundary with tract.

14. By location map, zoning and acreage of subject and adjacent tracts. Map shall show existing structures within 300 feet of project.

15. Existing and proposed land uses by parcel, including recommended zoning, density and number of units for each. Density is computed for each separate land use by parcel within a preliminary plat according to the total acreage available within that particular parcel whether developable or not, and the density established in the City's zoning ordinance.

16. Boundaries of project to be subdivided shall be fully dimensioned and the boundary monuments shown and identified.

17. Show layout of connections to adjacent properties, proposed streets and alleys, giving widths, and proposed names.

18. Number each lot individually and give total number of lots.

19. Show the method of sewage disposal, the preliminary layout of the system indicating grade rates, manhole locations, clean-outs and depths

(laterals may be shown in the plan view only), and the name of the proposed provider.

20. Show the method of water service, proposed layout of the water system indicating fire hydrants, valves, meter vaults, water line sizes and depths (services may be shown in the plan view only), and the name of the proposed provider.

Section 6.020 Hydrology Reports.

A. All preliminary plats submitted to the Community Development Department for review by the Engineering Division, shall include a hydrology report. See Chapter 10 of this Manual for submission requirements.

Section 6.030 Grading Plans.

A. All preliminary plats submitted to the Community Development Department for review by the Engineering Division, shall include a preliminary grading plan. See Chapter 3 of this Manual for submission requirements.

Section 6.040 Traffic Impact Analysis.

A. All preliminary plats submitted to the Community Development Department for review by the Engineering Division, shall include a traffic impact analysis. Said report shall include the information listed below.

1. The following Arizona Department of Transportation Trip Generation Intensity Factors shall be used as applicable, to determine the number of vehicle trips anticipated:

USE	FACTOR
Single Family Residential	10.0 trip/unit
Multiple Family Residential	6.8 trips/unit
Mobile Home Parks	5.9 trips/unit
Condominiums	7.2 trips/unit

Shopping Center	39.9 trips/1000 GFA*
Retail	75.2 trips/1000 GFA*
Offices	13.8 trips/1000 GFA*
Industrial	5.7 trips/1000 GFA*

* Gross Floor Area.

2. A current traffic study (within the past 6 months) shall be required for conditional use permit applications, rezoning applications, and/or other developments that will produce 100 or more site generated peak hour trips based on the Institute of Transportation Engineers (ITE) Trip Generation manual (latest edition).

   Typical developments which would meet this requirement would be:

Light Industrial	≥	93,000 sf
Heavy Industrial	≥	145,000 sf
Fast Food Restaurant	≥	950 sf
Restaurant	≥	3,200 sf
Bank	≥	1,950 sf
Hotel/Motel	≥	132 rooms
Apartment	≥	100 dwelling units
Condo/Townhouse	≥	100 dwelling units
Mobile Home Park	≥	100 dwelling units
Single Family	≥	100 dwelling units
Schools	≥	350 students
Office	≥	37,000 sf

3. All Traffic Impact Studies required by this standard shall follow the guidelines set forth in the latest edition of the Traffic Access and Impact Studies for Site Development as published by the Institute of Transportation Engineers.

4. The traffic impact analysis shall be prepared by a professional registrant specializing in the field of Traffic Engineering.

5. The traffic impact analysis shall be used to determine whether the existing roadway network in the area of the proposed development will be able to handle the existing traffic plus the additional traffic that the

subject development will generate.

6. The traffic impact analysis of the project development area shall contain sufficient information to adequately address the items listed below:

   a. Existing and proposed land uses.

   b. General street layout, including location, width and proposed names of public streets.

   c. Connections to adjoining platted or proposed tracts and existing or proposed thoroughfares

   d. Trip generation, directional distribution, traffic assignment, capacity analysis.

   e. Recommended solutions and improvements.

Section 6.050 General Information.

A. The preliminary plat shall comply with all the requirements of Title 16, the Subdivision Regulations of the Bullhead City Municipal Code, as applicable.

CHAPTER 7

FINAL PLATS

Sections:

Section 7.010 Final Plats - Submittal Requirements.

A. All final plats submitted to the Community Development Department for review by the Engineering Division, shall follow the standards of the items listed below.

1. Four paper copies drawn at a scale of one inch equals forty feet (1" = 40'), or adjusted to produce an overall drawing of twenty-four inches by thirty-six inches (24" X 36"). The drawings shall be readable, readily interpreted and sufficient for the purpose which they were prepared.

2. All parcels shall be numbered by block and lot numbers throughout the plat. Exceptions, tracts, private parks, etc... shall be so designated, lettered or named and clearly dimensioned.

3. Provide a computer closure of the final plat, including each individual block. The closure should be furnished with the first set of improvement plans submitted for review.

Section 7.020 Dedications & Acknowledgements.

A. All final plats submitted to the Community Development Department for review by the Engineering Division, shall contain as a minimum, all of the items listed below.

1. Statement of dedication of all streets, alleys, cross walks, drainageways, pedestrian ways, and other easements for public use by the person holding title of record, by persons holding title as vendees under land contract, and spouses of such parties. If lands dedicated are mortgaged, the mortgagee shall also sign the plat. Dedication shall include a written location by section, township and range of the tract. If the plat contains private street, public utilities shall be reserved the right to install and maintain utilities in the street rights-of-way.

2. Execution of dedication acknowledged and certified by a notary public.

Section 7.030 Certifications.

A. All final plats submitted to the Community Development Department for review by the Engineering Division, shall contain as a minimum, all of the certifications listed below.

1. Certification by the registered professional engineer and registered land surveyor making sure the design is correct and accurate, and the monuments described in it have been located as described.

2. Certificate of plat approval by:

a. Community Development Director
b. City Engineer
c. Mayor & Council
d. County Recorder
e. City Clerk

Section 7.040 Hydrology Reports.

A. All final plats submitted to the Community Development Department for review by the Engineering Division, shall include a final hydrology report. See Chapter 10 of this Manual for submission requirements.

Section 7.050 Geotechnical & Soils Reports.

A. All final plats submitted to the Community Development Department for review by the Engineering Division, shall include a final geotechnical and soils report. See Chapter 12 of this Manual for submission requirements.

Section 7.060 Grading Plans.

A. All final plats submitted to the Community Development Department for review by the Engineering Division, shall include a final grading plan. See Chapter 3 of this Manual for submission requirements.

Section 7.070 Improvement Plans.

A. All final plats submitted to the Community Development Department for review by the Engineering Division, shall include improvement plans. See Chapter 8 of this Manual for submission requirements.

Section 7.080 Financial Assurance.

A. All final plats submitted to the Community Development Department for review by the Engineering Division, shall include a financial assurance based on an approved Engineer's estimate. See Chapter 16.36 of the Bullhead City Municipal Code for submission requirements.

Section 7.090 General Information.

A. The final plat shall comply with all the requirements of Title 16, the Subdivision Regulations of the Bullhead City Municipal Code, as applicable.

CHAPTER 8

IMPROVEMENT PLANS

Sections:

Section 8.010 Improvement Plans - Single Family, Multiple Family, Commercial, Industrial, and Public Works Projects

A. All improvement plans for single family, multiple family, commercial, industrial, and public works projects submitted to the Community Development Department for review by the Engineering Division, shall follow the standards identified hereinbelow.

1. Three copies of the site plan and improvement plans, drawn at a scale of one inch equals forty feet (1" = 40'), or adjusted to produce an overall drawing of twenty-four inches by thirty-six inches (24" x 36"). The drawings shall be readable, readily interpreted and sufficient for the purpose for which they were prepared.

2. Proposed name of project and its location by address and/or legal description.

3. Name, address and phone number of owner.

4. Name, address and phone number of engineer and surveyor preparing the plans.

5. Assessor's parcel number, legal description and address.

6. Location map with reference to adjacent streets, north arrow, date, title, etc.

7. Plans should reflect all existing bench marks in the area of the project.

8. Topography by contours related to Mohave County, ADOT or NAVD (USC&GS) survey datum. Contour interval shall adequately reflect character and drainage of the land. (Projects that are one acre or less, that are not public works projects, may use an assumed datum and

contours may be waived.)

9. Location of fences, wells, lakes, ditches, existing drainage courses, power lines, etc.

10. Location, widths and names of all platted street, utility rights-of-way of public record. Permanent structures to remain, including water wells and utility lines within or adjacent to the property.

11. By location map, indicate the existing zoning classification of the subject and adjacent properties.

12. Existing structures within fifty feet of the project. The map may show the approximate size, shape and location only.

13. Topography on the adjacent properties sufficient to indicate the drainage patterns.

14. By note, zoning and acreage of the subject tract and zoning of adjacent projects.

15. Boundaries of the property shall be fully dimensioned and the boundary monuments shown and identified.

16. Designation of all land to be dedicated or reserved for public use.

B. All single family, multiple family, commercial, industrial, and public works projects submitted to the Community Development Department for review by the Engineering Division, shall also include the information identified hereinbelow.

1. A grading plan. See Chapter 3 of this Manual for submission requirements.

2. A hydrology report. See Chapter 10 of this Manual for submission requirements.

3. A geotechnical and soils report. See Chapter 12 of this Manual for submission requirements.

4. Compliance with the development standards set forth in Chapter 9 of this Manual, as applicable.

5. Compliance with the requirements of the Bullhead Fire Department for fire protection.

6. Compliance with the requirements of the applicable utility companies and Corporation Commission for the installation of utilities.

Section 8.020 Improvement Plans - Subdivisions General Requirements

A. All improvement plans for subdivisions submitted to the Community Development Department for review by the Engineering Division, shall be designated either urban or suburban. Urban subdivisions are comprised of lots that are less than one gross acre in size. Suburban subdivisions have lots that have one gross acre or more in area.

1. All subdivision projects shall be designed in accordance with the development standards set forth in Chapter 9 of this Manual.

B. All improvement plans for subdivision projects submitted to the Community Development Department for review by the Engineering Division, shall follow the standards identified hereinbelow.

1. Three copies of the improvement plans. Plans to be drawn at a scale of one inch equals forty feet (1" = 40'), or adjusted to produce an overall drawing of twenty-four inches by thirty-six inches (24" X 36"). The drawings shall be readable, readily interpreted and sufficent for the purpose for which they were prepared.

2. Proposed name of subdivision and its location by section, township and range, referenced by dimension and bearing to a quarter section corner or section corner.

3. Name, address and phone number of subdivider.

4. Name, address and phone number of engineer and surveyor preparing the plans.

5. Show the assessor's parcel number, legal description and address.

6. Identification of the proposed phases of development.

7. Location map, with reference to main arteries, etc., a title scale, date and

north arrow.

8. Topography by contours or spot elevations related to Mohave County, ADOT or USC&GS survey datum. Contour interval shall adequately reflect character and drainage of the land.

9. Location of fences, wells, lakes, ditches, existing drainage courses, power lines, etc. Location and extent of areas subject to inundation; indicate frequency, direction of flow, etc.

10. Location, widths and names of all platted streets, and utility rights-of-way of public record. Permanent structures to remain, including water wells and utility lines within or adjacent to property.

11. Name, book and page number of any recorded adjacent subdivision having common boundary with tract.

12. Boundaries of project to be subdivided shall be fully dimensioned and the boundary monuments shown and identified.

13. Show layout of connections to adjacent properties, proposed streets and alleys, giving widths, and proposed names.

C. All improvements plans for subdivisions submitted to the Community Development Department for review by the Engineering Division, shall include the information identified hereinbelow.

1. A grading plan. See Chapter 3 of this Manual for submission requirements.

2. A hydrology report. See Chapter 10 of this Manual for submission requirements.

3. A geotechnical and soils report. See Chapter 12 of this Manual for submission requirements.

4. Compliance with the development standards set forth in Chapter 9 of this Manual, as applicable.

5. Compliance with the requirements of the Bullhead Fire Department for fire protection.

6. Compliance with the requirements of the applicable utility companies, Arizona Department of Environmental Quality, and Corporation Commission for the installation of utilities.

D. All improvement plans for subdivisions submitted to the Community Development Department for review by the Engineering Division, shall include the standard details and plan and profile sheets.

CHAPTER 9

DEVELOPMENT STANDARDS

Sections:

Section 9.010 General requirements.

A. All single family, multiple family (duplex and above), commercial, industrial, public works, and subdivision projects shall comply with the development standards set forth in this Chapter, as applicable. A single family lot in a platted subdivision or a lot one acre or less will not be required to submit hydrology, geotechnical or soil reports.

B. All improvements in the public right-of-way or easements shall be designed in accordance with the Uniform Standard Specifications and Details published by the Maricopa Association of Governments as amended by the City of Bullhead City.

C. New street right-of-way or utility easements shall be shown on the plat and

shall be processed through the City of Bullhead City Community Development Department.

D. Any contractor found working on a project without an official set of stamped, approved drawings by the City of Bullhead City Community Development Department shall be shut down until further notice.

Section 9.020 Benchmarks and Monuments.

A. Plans should reflect all existing bench marks in the area of the project including horizontal control monuments such as section corners, quarter corners and boundary monuments.

B. The subdivider shall cause to be set, permanent survey monuments at locations approved by the Engineering Division. Such monuments shall be:

1. Set at all street intersections, angle points, point of curves, section and quarter corners, tangent points, lot corners and at such other points as may be required by the Community Development Director to make the retracing of the lines shown on the City official maps reasonably convenient;

2. Monuments of iron pipe, steel bars, or concrete. Brass caps in concrete bases can be used at all curve or P.I. points and in cul-de-sacs as per "Minimum Standards for Arizona Land Boundary Surveys".

C. After all improvements have been installed, a registered land surveyor shall set the location of monuments and certify their accuracy as set by the "As-Built" drawings.

Section 9.030 Lot measurements.

A. Lot width, depth and area shall comply with the minimum requirements of the zoning ordinance and shall be appropriate for the location and character of the development proposed, and for the type and extent of street and utility improvements being installed.

B. Minimum front setback lines shall conform to the minimum requirements of the zoning ordinance.

C. Side lot lines shall be substantially at right angles or radial to street lines, except

where other treatment may be justified in the opinion of the Engineering Division.

D. Every lot shall abut upon a public street furnishing satisfactory access thereto.

E. Through lots and reverse frontage lots.

1. Single family residential lots extending through the block and having frontage on two parallel streets shall have a one foot Non-Vehicular Access Easement across the back except in R1S zoning districts. Backing of lots to thoroughfares shall be prohibited, except where expressly permitted by these regulations or where justified in the opinion of the Engineering Division.

F. Where steep topography, unusual soil conditions, or drainage problems exist or prevail, the City Council may, upon the recommendation of the Community Development Department and Planning and Zoning Commission, recommend special lot width, depth, and area requirements.

Section 9.040 Maximum length of blocks.

A. The maximum length of blocks, measured along the center line of the street and between intersecting street center lines, shall be one thousand, three hundred twenty five feet (1,325'), except that in developments with lot areas averaging one-half (½) acre or more, or where topographic conditions warrant, this maximum may be exceeded. In R1S zoning districts, the maximum block length is 2,650'.

B. The maximum length of cul-de-sac streets shall be six hundred feet (600), measured from the intersection right-of-way lines to the extreme depth of the turning circle along the street center line. An exception may be made where topography justifies, but shall not be made merely because the tract has restrictive boundary dimensions, wherein provision should be made for extension of the street pattern to the adjoining unplatted parcel and a temporary turnaround installed. In R1S zoning districts cul-de-sac lengths shall not exceed 800'.

C. Blocks shall be as long as reasonably possible under the circumstances within the above maximums in order to achieve depth and possible street economy and to reduce the expense and safety hazard arising from excessive street intersections.

Section 9.050 Easements.

A. Alleys.

1. Where alleys are provided and overhead utilities are proposed, four feet (4') for aerial overhang on each side of an alley shall be provided and be delineated on the plat.

B. Drainage.

1. Where a stream or major water course, 2,000 to 3,000 CFS, abuts or crosses that tract, dedication of a public drainage easement of a width sufficient to permit widening, deepening, relocating or protecting such watercourse shall be required.

C. Guy and Anchor.

1. Guy and anchor easements one foot (1') wide on each side of the lot line, or two feet (2') wide on one side of a lot line, and approximately thirty-five feet (35') in length.

D. Major lines.

1. Land within a public street or drainage easement, within a utility easement for major power transmission lines (tower) or pipelines, shall not be considered a part of the minimum required lot area except where lots exceed one-half (½) acre in area. This shall not be construed as applicable to land involved in utility easements for distribution or service purposes.

E. Non-vehicular access.

1. Except where alleys are provided, lots arranged to back onto major streets, railroads, canals, commercial or industrial districts, the rear one foot (1') of which shall be recorded as a non-vehicular access private easement. This requirement shall not apply in the R1S zoning district.

Section 9.060 Curbs and Gutters.

A. All single family, multiple family (duplex and above), commercial, industrial, public works, and subdivision projects shall provide curbs and gutters as set forth below.

1. Curbs, gutters, aprons, and valley gutters shall be made of portland cement concrete.

2. Aprons and cross gutters shall have a minimum 0.002 foot per foot (0.2%) drop across intersection.

3. Curb returns shall usually have a minimum 0.001 foot per foot (0.1%) drop.

4. Minimum residential curb return radius of 20.5 (20-1/2') feet and 30.5 feet (30-1/2') minimum for arterial and collector streets to face of curb to include installation of the MAG Standard, Type A, Detail 220 curbing along the returns and handicapped curb openings.

B. All subdivision projects located in areas zoned R1S, shall provide curbs and gutters as set forth below.

1. Ribbon curb may be used. The pavement width includes the ribbon curb.

C. Irrespective of density for residential lots, the City Council may, upon the recommendation of the Community Development Department and Planning and Zoning Commission, require or waive curb and gutter or valley gutter requirements.

Section 9.070 Sidewalks and Bike Paths

A. All single family, multiple family (duplex and above), commercial, industrial, public works, and subdivision projects shall provide sidewalks and bike paths as set forth below.

1. Portland cement concrete sidewalks shall normally be required on both sides of streets and shall be constructed to a width, line and grade approved by the Engineering Division.

2. Bike paths shall be required as set forth in the General Plan Update. The bike paths shall be 6" thick concrete and constructed to a width, line and

grade approved by the Engineering Division.

3. Six inch (6") thick sidewalk and apron are required for areas adjacent to rolled curb. All other sidewalk are to be four inches (4") thick, except at alleys and driveways.

B. All subdivision projects located in areas zoned R1S are not required to provide sidewalks.

C. Where density of development is light or where, for other reasons, the installation of sidewalks and bike paths are not considered necessary, the City Council may, upon the recommendation of the Community Development Department and Planning and Zoning Commission, waive the requirement for sidewalks on one or both sides of the street.

Section 9.080 Streets and Pavement Striping

A. General requirements.

1. Low water crossings will be allowed across Local or Limited Use streets, as long as the lots along each section of the street continue to enjoy other, unobstructed access.

2. The height of storm water flow allowed to cross any local, or cul-de-sac street will not exceed 12 inches in depth in a 100 year storm event in order to allow access by emergency vehicles, unless alternate flood free access is provided.

3. Arterial, collector and dead end portions of cul-de-sac streets shall remain flood free in the 100 year storm event.

4. Provide barricades or delineators where there are traffic hazards at the end of the street.

5. City requires a "crown" or "invert" on all streets, and a cross-slope of 0.02 foot per foot of street width from "crown" to edge of pavement or face of curb, and a cross-slope of 0.03 foot per foot of street width on inverted streets.

6. For widening an existing pavement to a new curb and gutter location, show elevation shots along the center line, gutter line or T/C and edge of existing pavement. The new (additional) paving design is to provide the

necessary crown all the way to the finished gutter grades.

7. All developed collectors and arterials will be striped and marked according to the manual on Uniform Traffic Control Devices.

B. Maximum grades.

1. Arterial routes 10% or as determined by the Engineering Division. (12% - R1S zoning district)
2. Collector streets -- twelve percent (12%). (15% - R1S zoning district)
3. Local streets -- fifteen percent (15%). (20% - R1S zoning district)

C. Concrete or asphalt streets with concrete gutters:

1. Desirable grade -- 0.40 percent.
2. Minimum grade -- 0.15 percent (0.2% recommended). Less only with special approval of the Engineering Division.

D. Vertical curve requirements are as follows:

1. Arterial streets -- as determined by the design speed or safe stopping distance.
2. Collector streets -- minimum length one hundred feet (100').
3. Local streets -- 50' at intersections.

E. Horizontal alignment requirements are as follows:

1. Arterial and collector routes -- as determined by the design speed or safe stopping distance.
2. When tangent center lines deflect from each other more than ten degrees (10°) and less than ninety degrees (90°), they shall be connected by a curve with a minimum center line radius of one hundred feet (100') for local streets.
3. Between reverse curves there shall be a tangent section of center line not less than one hundred feet (100') long for local streets.
4. Streets intersecting an arterial route shall do so at a ninety degree

(90°) ± 5° angle; intersections of collector and local streets shall not vary from ninety degrees (90°) by more than fifteen degrees (15°).

5. Street jogs with center line offsets of less than one hundred twenty-five feet (125') shall be avoided except under special circumstances.

6. Street intersection with more than four (4) legs and Y-type intersections where legs meet at acute angles shall be avoided.

7. Local streets intersecting a collector street or arterial route shall have a tangent section of center line at least one hundred fifty feet (150') in length measured from the right-of-way line of the major street, except that no such tangent is required when the local street curve has center line radius greater than four hundred feet (400') with the center located on the major street right-of-way line.

8. At street intersections, property line corners shall be rounded by circular arc, said arc having a minimum radius of 20'..

F. Tapers.

1. Show sufficient pavement tapers at beginning and end of projects to properly channel traffic back to original or new alignment. Generally, tapers should be of temporary construction consisting of at least two inch (2") asphaltic base course over compacted native soil. (Tapers are to be saw-cut and removed when pavement is extended.)

2. Temporary pavement tapers for merging traffic situations are calculated by the following formula:

$$L = \frac{\text{M.P.H. X OFFSET}}{2}$$

3. For tapers which do not create a merging situation (such as where pavement widens with the traffic) a fifty foot (50') taper is adequate in most cases.

4. The above standards should be considered the minimum under normal conditions. However, there are bound to be exceptions.

G. Driveways and handicap ramps.

1. All driveway widths and locations shall be as per City detail, unless

otherwise approved by the Engineering Division.

2. They shall be constructed with a minimum of 6 inch (6") thick concrete and reinforced with 6 X 6 X 6 W.W.F., per MAG Details.

3. Driveways are not to be placed within two hundred feet (200') of a collector intersection, or one lot width, whichever is smaller. On local streets, the furthest point on the first lot from the intersection.

4. Include ramps for handicapped as per standard detail at all street corners and at "T"-intersections. The ramps shall be minimum of 12:1 slope.

H. All subdivision projects located in areas zoned R1S, shall provide streets as set forth below.

1. Low water crossings will be allowed across Local or Limited Use streets, as long as the lots along each section of the street continue to enjoy other, unobstructed access.

2. The height of storm water flow allowed to cross any local, or cul-de-sac street will not exceed 12 inches in depth, measured at the crown of the street, in a 100 year storm event in order to allow access by emergency vehicles, unless alternate flood free access is provided.

3. Arterial, collector and dead end portions of cul-de-sac streets shall remain flood free in the 100 year storm event.

4. The minimum pavement width shall be 24 feet including ribbon curbing.

5. Drainage ditches along the shoulders will be allowed.

Section 9.090 Fire access roadways.

A. Every building hereafter constructed shall be accessible to fire department apparatus by way of access roadways with all-weather driving surfaces as set forth below.

1. Said roadway shall not be less than twenty feet (20'). Offsite access shall not be less than 20'.

2. Adequate roadway turning radius shall be capable of supporting the imposed loads of fire apparatus and have a minimum of thirteen feet six inches (13' 6") of vertical clearance.

3. The required width of access roadways shall not be obstructed in any manner.

4. Owners and/or property representatives shall be required to identify and mark fire lanes to the satisfaction and approval of the fire marshal. This requirement shall be marked on the approved plans and complied with in the field.

5. The entrance to all required fire department access roads shall be posted with approved signs. A maximum distance of one hundred feet (100') shall be required in the spacing of signs along the length of the fire department access road. The placing of signs shall be subject to approval by the fire marshal.

6. When applicable, all curbing which outlines the access roads shall be painted red. White lettering reading "No Parking - Fire Lane" shall be a minimum of four inches (4") tall and shall be placed every fifty feet (50') or portion thereof, on top of designated curbing or striping. Additional striping of fire department access roads may be required under special conditions.

7. Fire department access areas for appliances, such as hydrants, standpipe inlets, sprinkler valves, etc., shall be so marked.

8. The access roadway shall be extended to within one hundred fifty feet (150') of all portions of the exterior walls of the first story of any building. Where the access roadway cannot be provided, approved fire protection system or systems shall be provided.

9. Required access roadways shall be kept a minimum of twenty-six feet (26') in width in the immediate vicinity of any building over thirty-five feet (35') in height above natural grade.

10. Maximum grade for access roadways shall be twelve percent (12%).

11. The minimum turning roadway radius for all turns shall be twenty-eight feet (28') inside turning radius, and forty-eight feet (48') outside turning radius.

12. If access roadways are not looped, then the provided dead-end access roadways will meet the requirements as specified in the following table:

Length	Turnarounds Required
* 0' - 150'	None required
* 150' - 600'	100' Diameter Cul-de-sac 120' Hammerhead

* Curves and topographical conditions could alter the requirements for turnarounds and the width of access-ways. When access road is serving more than one-hundred (100) units, two means of access are required.

Section 9.100 Pedestrian ways.

A. Pedestrian ways with a right-of-way width of eight feet (8') may be required where essential for circulation, or access to schools, playgrounds, shopping centers, transportation and other community facilities. Pedestrian ways may be used for utility purposes if they meet the minimum utility easement width.

Section 9.110 Street lights.

A. All single family, multiple family (duplex and above), commercial, industrial, public works, and subdivision projects shall provide street lights. See Chapter 13 of this Manual for the design and submittal requirements.

B. All subdivision projects located in areas zoned R1S, shall provide street lights as set forth below. Also, see Chapter 13 of this Manual for the design and submittal requirements.

1. At the intersection of two arterials, at the intersection of two collectors, and at the intersection of an arterial and a collector.

Section 9.120 Street name signs.

A. Signs shall be in place by the time the street pavement is ready for use. Specifications for design, construction, location and installation shall be in accordance with approved City standards.

Section 9.130 Sewer.

A. All single family, multiple family (duplex and above), commercial, industrial,

public works, and subdivision projects shall provide sewer as set forth herein.

B. General Requirements.

1. All sewer designs must be in accordance with Arizona Department of Environmental Quality (ADEQ) requirements. See Bulletin 11 for specific design and submittal requirements.

2. Prior to submitting subdivision plans, a master plan of the sewer with sizes, slopes, manhole flow lines and natural grades should be submitted.

3. Include the capacity for the future need for sewer from the surrounding area with regard to present design slopes and depth or additional land access easement width to provide gravity flow.

4. All sewer plans to include sheets at one inch equals forty feet (1" = 40') as a minimum, and also include a master layout sheet showing all utilities.

5. Provide a design spreadsheet detailing flows, slopes, velocity, distance, etc. for review by the Engineering Division.

6. All sewer mains must be P.V.C. (SDR 35) sewer pipe, unless otherwise approved by the Engineering Division.

7. Install clean-outs at the end of a line.

8. Show both water and sewer (on plan and profile) and the concrete encasement of sewer lines where necessary per standard detail.

9. Each lot or parcel must be provided with its own individual sewer service unless otherwise approved. Extend service outside right-of-way and any utility easements.

10. Maintain a minimum of 6' horizontal and 2' vertical clearance from water lines unless otherwise previously approved or provided for by special design such as encasement, etc.

11. Give station to each house connection and indicate typical dimension between the sewer service and the water service; provide a detail for the branding of the curb at those locations.

12. Show in the profile the relationship between sewer and water at each

crossing.

13. Both the slope and the end elevation must be shown on all sewer main stubs.

14. Design engineer is to furnish a copy of the cut sheets to the city inspector.

15. Sewer mains are normally placed five feet (5') south or west of street center lines (see Utility Placement Details), or as determined by the Engineering Division.

16. Sewer mains shall be low enough to avoid conflicts with all other utilities (water services, telephone company, electric, storm drains, gas [see utility placement details]).

17. Flow velocities are to be 2.5 FPS, minimum.

C. Manholes.

1. Install manholes at each change in grade and direction, and at the beginning and end of each run and no more than five hundred feet (500') apart.

2. Call out a minimum four foot (4') diameter manholes.

3. If pipe is not laid through a manhole location, then a 0.1 foot minimum drop is to be designed through the manhole.

D. All subdivision projects located in areas zoned R1S, may provide one of the sewer methods as set forth below.

1. Gravity.

a. May be used if the boundaries of the subdivision are within 500 ft. of a sewer line.

2. Low Pressure. (Private Individual System)

a. All sewer mains must be P.V.C. (SDR-21 [minimum pressure rating of 160 psi]) pressure pipe, unless otherwise approved by the Engineering Division.

b. Install accesses where necessary per standard detail.

c. Show both water and sewer (on plan and profile) and the concrete encasement of sewer lines where necessary per standard detail.

d. Each lot or parcel must be provided with its own individual sewer service unless otherwise approved and shown on the improvement plans.

e. Maintain at least minimum horizontal and vertical clearance from water lines per ADEQ requirements unless otherwise previously approved or provided for by special design such as encasement, etc.

f. Show in the profile the relationship between sewer and water at each crossing.

g. Design engineer is to furnish a copy of the cut sheets to the Engineering Division.

h. Low pressure sewer mains are normally placed ten feet south or west of street center lines (see Utility Placement Details), or as determined by the Engineering Division.

I. Sewer mains shall be low enough to avoid conflicts with all other utilities (water services, telephone company, electric, storm drains, gas [see utility placement details]).

j. Prior to submitting subdivision plans, a master plan of the sewer with sizes should be submitted for review with the preliminary plat for subdivision review; provide a design spreadsheet detailing flows, pump pressures, velocity, distance, etc for review by the Engineering Division.

k. ADEQ requires that sewer lines be encased in concrete and that the water line be cast ductile whenever the water line crosses under the sewer line.

l. Give station and distance to each low pressure pump housing and indicate typical dimension between the sewer service and the water service.

m. Design shall also comply with ADEQ Bulletin 11.

n. All sewer plans to include sheets at one inch equals forty feet (1" = 40') as a minimum, and also include a master layout sheet showing all utilities.

o. All sewer lines shall be installed with taps in place to the right-of-way line.

p. All low pressure lines and services shall have back flow preventors, anti-siphon devices and line shut off valves installed in order to protect the homes. The back flow preventors shall be sufficient to withstand 2.5 times the highest anticipated design pressure. A minimum of one [1] each anti-siphon device, line shut off valve and back flow preventor at the pump with one [1] back flow preventor, in a valve box, at the right-of-way line is required.

3. Sewer - Individual Septic Systems

a. Individual systems may be constructed.

b. Installation shall be in compliance with ADEQ Bulletin #12.

Section 9.140 Storm Drainage.

A. All single family, multiple family (duplex and above), commercial, industrial, public works, and subdivision projects shall provide for storm drainage. See Chapter 11 of this manual for the development standards and submittal requirements.

Section 9.150 Water.

A. All single family, multiple family (duplex and above), commercial, industrial, public works, and subdivision projects shall provide water service as set forth herein.

B. General Requirements.

1. All water designs shall be designed in accordance with Arizona Department of Environmental Quality requirements and the utility provider.

2. Show water lines, fire hydrants and valves.

C. All subdivision projects located in areas zoned R1S, may provide domestic water service from wells that are properly permitted.

Section 9.160 Fire hydrants.

A. Fire hydrants are required with a normal maximum spacing of six-hundred feet (600') and usually placed at the northeast corner of intersections. It should be noted, however, that it may be necessary due to subdivision phasing, intersections, street pattern, lot density, etc., that shorter spacing may be required. Commercial and multi-family projects will require fire hydrants spacing at three hundred (300').

B. If a fire hydrant is on a dead-end, the line up to the hydrant is to be at least eight inches (8") in diameter.

C. All subdivision projects located in areas zoned RIS, shall provide self contained fire protection systems with fire sprinklers throughout the dwelling unit and garage if there are no water mains with fire hydrants.

Section 9.170 Utilities - General.

A. Developer shall submit public utility plans. All utilities shall be placed underground within the subdivision.

B. The improvement plans must include a general master utility layout for the subdivision as one of the sheets in the total set of plans.

C. The developer is required to contact utility company for location of existing and proposed buried conduit or cable which must be shown on plans. The developer shall place 4-4" PVC sleeves at all intersections for future utility crossings.

D. All subdivisions located in areas zoned R1S, shall be permitted to install electrical, cable and telephone utilities overhead.

Section 9.180 Electrical distribution lines.

A. All electrical distribution lines shall be placed underground in accordance with Arizona Corporation Commission specifications. The requirement for underground electrical lines shall not apply to feeder lines from the substation to the subdivision.

Section 9.190 Telephone lines.

A. All telephone lines shall be placed underground in accordance with Arizona Corporation Commission specifications.

Section 9.200 Landscaping, Irrigation and Sprinkler Systems.

A. All landscape water, sprinkler or irrigation systems shall be approved by the Engineering Division and shall be designed so that the system does not overflow or spray onto any adjoining public paved areas.

B Schedule 40 P.V.C. sleeves are required for sprinkler systems. Size the P.V.C. sleeves as per landscape architect instructions.

Section 9.210 Recreation vehicle (RV) parks, manufactured home parks and park models requirements.

All RV parks, manufactured home parks, and park models shall comply with the development standards for a single family residential subdivision unless otherwise specified herein.

CHAPTER 10

HYDROLOGY REPORTS

Sections:

Section 10.010 General Requirements - Single Family, Multiple Family, Commercial, Industrial, Public Works, and Subdivision Projects

A. All single family, multiple family (duplex and above), commercial, industrial, public works, and subdivision projects over one acre in area, submitted to the Community Development Department for review by the Engineering Division, shall submit a hydrology report in a separate bound folder. Said report and related plans shall follow the standards identified hereinbelow. A single family lot in a platted subdivision or a lot one acre or less will not be required to submit hydrology, geotechnical or soil reports.

1. Three copies of the report and any supporting plans, drawn at a scale of one inch equals forty feet (1" = 40'), or adjusted to produce an overall drawing of twenty-four inches by thirty-six inches (24" x 36"). The drawings shall be readable, readily interpreted and sufficient for the purpose for which they were prepared.

2. Proposed name of project and its location by address and/or legal description.

3. Name, address and phone number of owner.

4. Name, address and phone number of engineer and surveyor preparing the plan's.

5. Assessor's parcel number, legal description and address.

6. Location map with reference to adjacent streets, north arrow, date, title, etc.

7. All proposed buildings, asphalt, grass, concrete or desert landscape and dimensions of same.

8. Existing and finished grades of all surfaces (especially finished floor elevations) and at property lines and back of sidewalks.

9. All items of construction that will affect drainage.

10. If the site is subject to off-site drainage, provide additional calculations and recommendations to handle off-site flows.

11. Delineate the boundaries of the watershed. If the subdivision is subject to off-site drainage, include the applicable off-site areas.

12. Indicate any existing drainage or irrigation structures such as waste or delivery ditches, natural drainage channels, etc., and what will be done with them.

13. Indicate on the maps and/or plans the drainage pattern of all streets.

14. Indicate the detention/retention volume required. Present a preliminary basin plan including size, depth and possible methods of drainage. In areas where the basin might be an "attractive nuisance" for children, fences will be needed around the basin.

15. The proposed design of the storm water collection system and retention system, including drainage calculations and storm drainage systems, their compatibility with existing systems, and the timing and/or phasing installation.

16. Approximate size and location of the above may be required on the plan by the Engineering Division.

17. If storm run-off flows onto the property to be subdivided from adjacent properties, this must be included in detail in the report. Drainage area, calculated peak flows, and other pertinent run-off data must be presented. The run-off from areas outside the subdivision should be carried through the new subdivision.

Section 10.020 Hydrology Methodologies

A. Use ADOT, SCS or Rational methods subject to approval of the Engineering Division.

B. Technical recommendations regarding SCS parameters are made, some of which cannot be applied using TR-20. Therefore, HEC-1 is the recommend computer program for application of the proposed methodology.

Section 10.030 Rational Method

A. Limit use of the rational method to watersheds of 80 acres or less, or drainage basins with a time of concentration of ten minutes or less. If the use of channel or reservoir routing is necessary for sizing channels or detention facilities, then use of the Rational method should be prohibited. The Rational Method should be used for peak flows rates only for watersheds greater than 20 acres. (HEC-1 may also be used for a watershed with a time of concentration under 10 minutes.)

1. Table 10.030(A) includes the Rational C runoff coefficients proposed for use with the Rational Method.

Section 10.040 Soil Conservation Service Method

A. The Soil Conservation Service (SCS) method should be used for watersheds with a time of concentration of ten minutes or greater, and where channel or reservoir routing are necessary, or hydrographs must be combined or diverted. The ADOT Hydrologic Design for Highway Drainage in Arizona may not be used for application of SCS methodology. Use of the SCS TR-55 computer program is acceptable for single watersheds with a time of concentration of less than two (2) hours. The SCS TR-20 and the U.S. Army Corps of Engineers (COE) HEC-1 computer program are acceptable mechanisms for application of the SCS methodology. The SCS National Engineering Handbook, Section 4 Hydrology, latest edition, should be used as a reference for application of the SCS Methodology.

1. (Guidelines for determining input parameters for computerized application of the SCS method follow. General procedures for application of the method, including sub-basin delineation and applicability, are contained in the SCS National Engineering Handbook, Section 4 Hydrology. These guidelines are intended to provide an outline for a more uniform application of the method, and therefore better reproducibility of results.)

a. Rainfall - Point precipitation values are to be derived from the NOAA Atlas 2.

b. Tables 10.040(A) and (B) include the rainfall distributions to be used for 1-hour and 24-hour duration storms.

2. Areal Reduction - Use NOAA Hydro-40 for estimation of an areal reduction curve.

3. Rainfall Excess - Utilize the Initial and Uniform Loss method. Refer to the COE HEC-1 Flood Hydrography User's Manual, the USBR Design of Small Dams, and the USBR Flood Hydrology Manual.

4. Initial and Uniform Loss parameters may be estimated using SCS Hydrologic Soils Groups, of SCS soil texture classifications. The preferred method is SCS soil texture classifications. Utilize the preliminary (final when published) "SCS Soil Survey for Mohave County".
   a. Tables 10.040(C), (D), (E), and (F) are to be used for estimating Initial and Uniform Loss parameters from soil textures or curve numbers.

5. The HEC-1 input parameter for Initial Loss, STRTL, is equal to the sum of IA + IL. The input parameter for Constant Loss is CNSTL. Due to the extremely small vegetation cover densities typical for the Bullhead City area, no adjustment of CNSTL for vegetation cover is necessary. Composite values for STRTL, CNSTL, and Percent Impervious should be estimated for each watershed using land use and soil characteristics.

6. Unit Hydrography - The SCS dimensionless unit hydrography is to be used.

7. Lag Time - Lag Time (T_L) is to be estimated using the expression $T_L = 0.6T_C$. Time of Concentration is to be estimated using the procedures set forth in Urban Hydrology for Small Watersheds.

8. Hydrography Channel routing - Hydro channel routing is to be done using the Normal Depth option under HEC-1 where possible and appropriate. The Kinematic Wave routing method may be used for well defined man-made channels and pipes.

9. Hydrography Reservoir Routing - Reservoir routing for detention basin design and modeling shall be done using the Modified Plus Method under HEC-1, or by a similar method with prior approval of the City.

10. Channel Transmission Losses - Channel transmission losses may be included in the model where deemed appropriate. Loss rates may be taken from Table H using SCS Soil Survey Data or justified by soils sampling and testing.

11. Design Storms - The 100-year 1-hour duration storm shall be used for all watershed areas less than 20 acres. For watersheds greater than 20 acres and less than 80 acres, the larger discharge resultant from either a 100 year 1-hour or 24-hour duration storm shall be used. For watersheds greater than 80 acres the 100-year 24-hour storm shall be used.

Section 10.050 Hydraulic Methodology

A. In addition to the criteria set forth in the Bullhead City Procedures Manual, the following design storms shall be used:

1. Open Channels - All open channels shall be designed to safely convey the 100-year peak discharge. Channels where the 100-year peak discharge is less than 500 cfs may be designed using the Manning formula, unless safety dictates a more detailed analysis. Channels with 100-year peak discharges in excess of 500 cfs shall be analyzed using the COE HEC-2 computer program, latest version.

2. Pipe Culverts, Box Culverts, and Bridges - All roadway cross structures in channels with a 100-year peak discharge in excess of 500 cfs shall be designed using the COE HEC-2 computer program to convey the 100-year peak discharge without overtopping the road or impacting the bottom chord of the bridge and using a minimum freeboard of one foot(1'). Roadway cross structures in channels with a 100-year peak discharge of less than 500 cfs shall be designed to convey the 50-year peak discharge without overtopping the road using a minimum freeboard of one foot (1'). The maximum depth of flow over the road for this case shall not exceed 0.5 feet for the 100-year peak discharge.

Table 10.030(A)
C Coefficients for Use with the Rational Method

C Coefficients for Use with the Rational Method	
Streets	
Asphalt	0.70 - 0.95
Concrete	0.80 - 0.95
Gravel Roadways and Shoulders	0.40 - 0.60
Industrial Areas	
Flat Commercial (about 90% impervious)	0.80
Heavy	0.60 - 0.90
Light	0.50 - 0.80
Business Areas	
Downtown	0.70 - 0.95
Neighborhood	0.50 - 0.70
Residential Areas	
Lawns - flat	0.05 - 0.15
Lawns - steep	0.15 - 0.35
Suburban	0.25 - 0.40
Single family	0.30 - 0.50
Multi Unit	0.40 - 0.60
Apartment	0.50 - 0.70
Parks, Cemeteries	0.10 - 0.25
Playgrounds	0.20 - 0.30
Agricultural Areas	0.10 - 0.20
Bare Ground	0.20 - 0.30
Undeveloped Desert	0.30 - 0.40
Mountain Terrain (slopes > 10 percent)	0.60 - 0.80

Table 10.040(A)
Soil Conservation Service
1-Hour Storm Rainfall Distribution

1-Hour Storm Rainfall Distribution (1.5 Minute Time Increment)			
0.000	0.010	0.020	0.030
0.040	0.050	0.065	0.080
0.100	0.120	0.140	0.160
0.180	0.225	0.300	0.400
0.530	0.600	0.640	0.665
0.700	0.725	0.750	0.775
0.800	0.820	0.840	0.858
0.875	0.891	0.906	0.919
0.931	0.942	0.952	0.961
0.969	0.977	0.985	0.993
1.000			

Table 10.040(B)
Soil Conservation Service
24-Hour Storm Rainfall Distribution

SCS Type II 24-Hour Rainfall Distribution (15 Minute Time Increment)				
0.0000	0.0020	0.0050	0.0080	0.0110
0.0140	0.0170	0.0200	0.0230	0.0260
0.0290	0.0320	0.0350	0.0380	0.0410
0.0440	0.0480	0.0520	0.0560	0.0600
0.0640	0.0680	0.0720	0.0760	0.0800
0.0850	0.0900	0.0950	0.1000	0.1050
0.1100	0.1150	0.1200	0.1260	0.1330
0.1400	0.1470	0.1550	0.1630	0.1720
0.1810	0.1910	0.2030	0.2180	0.2360
0.2570	0.2830	0.3870	0.6630	0.7070
0.7350	0.7580	0.7760	0.7910	0.8040
0.8150	0.8250	0.8340	0.8420	0.8490
0.8560	0.8630	0.8690	0.8750	0.8810
0.8870	0.8930	0.8980	0.9030	0.9080
0.9130	0.9180	0.9220	0.9260	0.9300
0.9340	0.9380	0.9420	0.9460	0.9500
0.9530	0.9560	0.9590	0.9620	0.9650
0.9680	0.9710	0.9740	0.9770	0.9800
0.9830	0.9860	0.9890	0.9920	0.9950
0.9980	1.0000			

Table 10.040(C)
Surface Retention Loss for Various Land Surfaces

Surface Retention Loss for Various Land Surfaces	
Land-use and/or Surface Cover	Surface Retention Loss IA, Inches
Natural	
Desert and Rangeland, Flat Slope	0.35
Hillslopes, Sonoran Desert	0.15
Mountain, with vegetated surface	0.25
Developed (Residential and Commercial)	
Lawn and Turf	0.20
Desert Landscape	0.10
Pavement	0.25
Agricultural	
Tilled Fields and Irrigated Pasture	0.50

Table 10.040(D)
Initial Loss Plus Uniform Loss Rate Parameter Values
Soil Texture Classification

Initial Loss Plus Uniform Loss Rate Parameter Values for Bare Ground according to Soil Texture Classification				
Soil Texture Classification	Uniform Loss Rate CNSTL	Initial Loss, Inches IL*		
		Dry	Normal	Saturated
sand	4.60	1.3	1.3	0
loamy sand	1.20	0.8	0.8	0
sandy loam	0.40	0.7	0.6	0
loam	0.25	0.8	0.7	0
silty loam	0.15	0.6	0.5	0
silt	0.10	0.6	0.5	0
sandy clay loam	0.06	0.6	0.5	0
clay loam	0.04	0.5	0.4	0
silty clay loam	0.04	0.6	0.5	0
sandy clay	0.02	0.4	0.3	0
silty clay	0.02	0.4	0.3	0
clay	0.01	0.3	0.2	0

*Selection of IL
Dry = Non-irrigated land such as desert and rangeland:
Normal = Irrigated lawn, turf, and permanent pasture:
Saturated = Irrigated agricultural land.

Table 10.040(E)
Initial Loss Plus Uniform Loss Rate Parameter Values
Hydrologic Soil Group

Initial Loss Plus Uniform Loss Rate Parameter Values for Bare Ground according to Hydrologic Soil Group				
Hydrologic Soil Group	Uniform Loss Rate CNSTL	Initial Loss, Inches IL*		
		Dry	Normal	Saturated
A	0.40	0.6	0.5	0
B	0.25	0.5	0.3	0
C	0.15	0.5	0.3	0
D	0.05	0.4	0.2	0

*Selection of IL
Dry = Non-irrigated land such as desert and rangeland:
Normal = Irrigated lawn, turf, and permanent pasture:
Saturated = Irrigated agricultural land.

Table 10.040(F)
Percent Impervious Estimates

Percent Impervious Estimates for Bullhead City Zoning Classifications		
Zoning District	Density District	Percent Impervious (Including R/W)
	1	70
R1MH	2	65
R1L, R1, R2MF, RS, C1, C2, and C3	3	65
R1L	4	60
R1MH	12	34
M1 and M2	35	22

Table 10.040(G)
Channel Infiltration Loss Rates

Channel Infiltration Loss Rates			
Bed Material Group	Loss Rate Description	Bed Material Characteristics	Effective Hydraulic Conductivity K(in./hr.)
1	Very high loss rate	Very clean gravel and large sand	>5
2	High loss rate	Clean sand and gravel, field conditions	2.0 - 5.0
3	Moderate high loss rate	Sand and gravel mixture with low silt clay content	1.0 - 3.0
4	Moderate loss rate	Sand and gravel mixture with high silt clay content	0.25 - 1.0
5	Insignificant loss rate	Consolidated bed materials: high silt clay content	0.001 - 0.10

CHAPTER 11

STORM DRAINAGE FACILITIES & FLOOD RETENTION BASINS DESIGN AND CONSTRUCTION

Sections:

Section 11.010 Detention/Retention Policy

A. Subdivisions will provide detention/retention through the use of regional and area basins. On lot detention/retention will be considered on a limited basis. The area considered as generating run-off to be retained, shall be the subdivision itself and the adjacent streets as required in the street run-off policy.

Section 11.020 General Design Standards

A. Place inlets wherever the flow exceeds the street capacity according to the charts in this manual. The inlets are to be analyzed separately using the catch basins as per MAG Detail 534 or 535 with a sediment/oil separation chamber below the outlet pipe invert (include a 3701 Neeman or equal CB trap).

B. Size the storm drains according accepted engineering practice. It is not required to keep the hydraulic gradient within the pipe, however depths and limits of ponding areas should then be shown. The improvement plans must designate the type of pipe to be used including alternates, size and slope. Use following as a guide for choosing pipe required in different situations. (C.M.P. is not allowed without special permission of the Engineering Division. Special permission will be based on providing soils information relating to life span expectancy for C.M.P.)

C. Reinforced concrete pipe (R.C.P. thirty-six inch (36") inside diameter, or larger, and R.G.R.C.P. any diameter) may be used in all situations. The engineering drawings shall designate the class or D-load specifications as per ASTM-C-76, and, when requested, the engineer shall verify the choice of pipe with load computations.

D. Cast-in-place pipe may be used in certain situations. The engineer is required to provide evidence that soil conditions are adequate for use of this pipe as an alternate.

E. Corrugated metal pipe (C.M.P.) is not allowed without special permission of the engineering department. Where C.M.P. is used bituminous coating will be required. Permission to use C.M.P. will be contingent on:

1. Soils test prove that the soil in the installation location are neither alkaline, nor acidic and have sufficient bearing capacity and strength to support the pipe.

2. Materials and installation specifications shall be furnished for review and approval to insure structural and corrosive integrity.

3. The Manufacturer's specifications and installation requirements demonstrate a service life equal to or greater than sulfate resistant R.C.P.

4. Clarify maintenance of basins. If the basin is to maintained by the City, the developer shall obtain prior approval from the Engineering Division. It is understood that the following are minimum requirements for city acceptance and maintenance of the basin.

5. Construction of the retention basin and the installation of all structures, sprinklers, and landscaping within the basin shall be completed and accepted by the city prior to release of the assurances.

6. All improvements must be installed, tested and maintained for a minimum of sixty (60) days, or longer, if required.

7. As-built mylars of the drainage system, sprinkler and landscaping plans must be furnished to the city by the developers' engineer.

8. After satisfactory completion of items (1), (2), and (3), the developer shall request a final acceptance inspection. If acceptable, a lien-free title for the basin area shall be deed to the City. The deed will be required prior to the release of referenced assurances.

Section 11.030 Detention Basin Design Parameters

A. Detention basins should be sized to reduce post-development runoff flow rates down to, or less than, pre-development flow rates. The design storm for detention basins should be based on the 100-year 1-hour duration for contributing basins under 20 acres, the higher peak discharge resultant from 100-year 1-hour or 24-hour storm duration for greater than 20 acres, but less than 80 acres, and for contributing areas greater than 80 acres the 100-year 24-hour storm. Regional detention facilities may be required to be reviewed by the Arizona Department of Water Resources (ADWR). This will be required if the structure is determined to fall within certain regulatory guidelines specified in ARS Title 45, Chapter 6, Article 1 and references in 45-1201. In General, the structure may be considered regulatory by ADWR if:

1. The structure is 25 feet or more in height, measured from the low downstream toe to the crest of the emergency spillway.

2. The volume at the crest of the emergency spillway is 50 acre-feet or more.

3. Structures may be specifically excluded from review by ADWR if:

   a. The height, calculated per item 1 above, is less than 6 feet.

   b. The volume is not in excess of 15 acre-feet.

B. Retention basins will be sized and designed similar to Detention Basins, but will be allowed only when detention basins are not feasible. Special features such as leach fields and dry wells may also be considered.

C. Exceptions to the detention/retention policy may be granted by Bullhead City for the following:

1. The development or improvement is proven to not increase runoff downstream in excess of the downstream conveyance capacity. The burden of proving the capacity of the downstream conveyance system is placed on the entity or party proposing the development or improvement. The capacity of the downstream conveyance systems shall be analyzed in accordance with accepted engineering methods and shall be based on runoff from the development or improvement as fully improved, and include runoff from all contributing areas as fully improved.

2. Developments or improvements that meet all of the following requirements:

   a. The plat showing the parcel was recorded before July 1, 1985.

   b. The area of the development or improvement is less than one (1) acre.

   c. Developments between one half acre and one acre are less than 80% impervious. Those greater than 80% impervious require additional review and approval of the City's Engineering Department.

   d. The use of multiple lots for one improvement or development voids the exception. The use of multiple lots totally less than one (1) acre in area will be considered for exception with prior approval.

   e. Developments or improvements that are in areas included in the Mohave County Airport/Bullhead City Flood Control Project and meet the Future Drainage Design Criteria listed in the "AS-BUILT REPORT" dated October 24, 1989. However areas (such as the ones located west of the Airport runway) for which the Project did not include the development of out falls to the river must provide a means for getting all increased runoff into the Colorado River in order to be exempted.

   f. Detention/retention has been provided on a regional basis and the proposed development or improvement matches the design criteria of the regional detention/retention.

   g. All retention areas must be able to be drained in thirty-six (36) hours.

   h. On lot detention/retention shall be provided on the lot itself without depressing the right-of-way area. Asphalt parking area, landscape areas and underground storage volumes may be used for detention/retention purposes, but this does not exclude other designs. Detention/retention areas shall be improved with some type of landscaping. Basins shall not be more than three and one-half feet (3.5') deep as measured from the natural ground to the bottom of the basin. No excavation will be permitted in city right-of-way.

Section 11.040 Dry Wells.

A. The City permits the use of dry wells to drain retention areas in privately maintained projects if there is no other convenient method available to drain the site, and where the dry wells have been designed and constructed according to the guidelines of this policy. Dry wells will only be used with prior written concurrence of the Engineering Division.

B. Normally, dry wells will not be permitted in any project to be maintained by the City or where public street drainage is to be retained in a private retention basin.

C. Dry wells are considered as temporary solutions to any drainage problem. It is the owners' responsibility to maintain the dry well and to make a connection to a storm drain if one becomes available in the future. Dry wells that cease of drain a project in a thirty-six hour period are to be replaced with new ones where alternate methods of drainage are still not available.

D. Typical details for dry wells are included at the back of this section in the procedures manual.

E. The following statement shall appear on all plans which include the use of dry wells: "All dry wells shown on this project shall be maintained by the owners and are to be replaced by the owners when they cease to drain the surface water in a thirty-six (36) hour period. Regular maintenance of the dry well silting chamber is required to achieve the best operation of the dry well."

F. The number of dry wells used shall be such that the volume to be drained by each well shall not exceed nine thousand, three hundred (9,300) cubic feet. The engineer shall submit information substantiating the number of dry wells.

G. The excavation required for each well shall be such that ten feet (10') of penetration into sand or gravel has been achieved or 10' above groundwater.

H. The Public Works Inspection Division shall inspect each well site prior to placement of the liner and back-fill to verify ten feet (10') of penetration into sand and gravel. Where it is unclear whether sand and gravel has penetrated, a percolation test shall be performed in the following manner:

I. The dry well shall be filled with clean water until the rate of inflow and the percolation rate have stabilized for a period of one (1) hour. If the rate of inflow is greater than or equal to 0.5 cfs, the dry well shall be considered acceptable. If the rate of inflow is less than 0.5 cfs, succeeding dry wells installed shall be increased in depth or the total number of dry wells on the project increased to

make up the difference.

J. The Engineering Division may alter this policy on an individual project basis to better meet the needs of each project or to adjust to special conditions. This includes, but is not limited to, the right to reject or accept the use of dry wells on any private or public project.

K. As approved by the Engineering Division, PRIVATELY MAINTAINED BASINS where no public street run-off is involved, may be drained by surface spreading in landscaped areas no deeper than twelve (12) inches or by dry wells. If the site is convenient to a city storm drain, it may be required to construct a bleed-off line to the storm drain. Bleed-off lines if used (twelve inches {12"} or larger), shall have a valve or some other method of shutting off flows. These control valves shall be installed such that they are readily available for city checking and are normally kept in a closed position.

L. Leach trenches will be wrapped in filter fabric to control fines, and inlets will be constructed with a silt chamber in the bottom. A rock voids ratio of forty percent (40%) for large size rock is acceptable, if the design engineer certifies.

M. The use of pumps to drain basins will require prior approval and additional submittals on the proposed system.

N. For basins, all side slopes shall be six to one (6:1), or flatter. Bottom slopes shall be a minimum of one percent (1%). Basins with steeper slopes will require prior approval and fencing.

O. The maximum ponding depth for parking lot detention facilities is 18 inches.

Section 11.050 Basin Design

A. Design of detention facilities in hydrologic basins of less than or equal to 20 acres may be done using a triangular hydrograph developed using the Rational Method. The hydrograph is based on the following assumptions:

1. The proportion of time to peak(t_p) to the total time base of the hydrograph (t_b) is 2.67(i.e. $t_b = 2.67\ t_p$).

2. Flow increases linearly from $Q = 0$ to $Q = Q_{peak}$ for $t = 0$ to $t = t_p$.

3. Flow decreases linearly from $Q = Q_{peak}$ to $Q = 0$ for $t = t_p$ to $t = 2.67 t_p$.

4. The peak discharge for a particular recurrence interval storm estimated

using the Rational Method is the same order of magnitude as the peak discharge estimated using a 1-hour duration storm and the SCS unit hydrograph procedure.

5. The area bounded by the simplified triangular hydrograph is approximately equal to the runoff volume from a 1-hour duration storm.

B. The relationship of $t_b = 2.67\ t_p$ is typical for hydrographs generated using an SCS unit hydrograph, that are simplified using a triangular configuration. The procedure for applying this simplified method is as follows:

1. Determine the controlling outflow limitation, either the downstream conveyance capacity or the pre-developed peak discharge , whichever is less.

2. Determine the post development peak discharge using the Rational Method.

3. Determine the post-development runoff volume for a 100-year 1-hour storm using:

   V_{Post} = CAP, where:

   V_{Post} = post-development runoff volume (acre-feet)

   A = Watershed area (acres)

   P = 100-year 1-hour precipitation (feet)

4. Calculate the time to peak (t_p) for the triangular hydrograph using:

   $t_p = 9.08\ V_{Post}/Q_{Post}$ where:

   t_p = time to peak (hours)

   Q_{Post} = Post-development peak discharge (cubic feet per second, cfs)

5. Calculate the triangular hydrograph time base using $t_b = 2.67\ t_p$.

6. Construct a triangular hydrograph using t_p, t_b, Q_{outlet}, and Q_{Post}, similar to Figure A.

7. The required detention storage volume is the cross hatched area indicated on Figure A. It can be calculated using:

$V_R = 0.0413\ t_b\ (Q_{Post} - Q_{outlet})$ where:

V_R = Required volume (acre-feet)

Q_{outlet} = The controlling outlet capacity limitation (cfs)

C. Design of detention facilities in hydrologic basins greater than 20 acres will be developed using the hydrograph calculated using HEC-1, SCS TR-55, or SCS TR-20. These programs can calculate a hydrograph for any location in the hydrologic basin. The data input file must be structured so that the proposed detention basin site is a hydrograph routing or hydrograph combining point. for specific input format, see the various user's manuals for each program. (TR-55 is only appropriate for single basin models). The design detention is determined by trial and error using the storage routing functions for the various programs.

Section 11.060 Street Capacity

A. Streets must be constructed to carry the runoff from a ten (10) year storm between the curbs. In cases where the peak flows from the design storm exceed the street capacity, underground pipes of sufficient size to carry the excess must be installed. The peak flows from the 100-year 24 hour storm must be carried within the right-of-way with the water elevation 1 foot or more below the lowest finished floors.

Section 11.070 Flood Zone Compliance

A. All developments that fall within a special flood hazard area shall comply with the requirements of Chapter 15.36-Floodplain Regulations, of the Bullhead City Municipal Code, which specifies the need for elevated finished floors and flood protection.

Section 11.080 Subdivision Requirements

A. The developer and his/her consulting engineer shall be advised whether or not the floodplain area delineated by the consulting engineer falls within the ordinance and what action is necessary. The boundary of the floodplain shall be identified on the preliminary plat as well as the maps in the improvement plans.

B. Improvement plans shall include a grading plan that specifies finished floor elevations (or window wells in the case of a basement) for all lots. (A compacted dirt pad with an elevation eight (8") inches lower than finished floor is acceptable.)

C. The design engineer shall include the following pre-construction certification statement on the grading plan and on the plat:

> I certify to the best of my knowledge, information and belief that the boundary of the 100 year floodplain, and the zone designations shown on the plat and on the approved grading for this Subdivision are shown accurately and that the finished floor elevations shown for each lot in the flood zone are (1) one foot above the regulatory base flood elevation according to (FEMA) Flood Insurance Rate Map.
>
> ENGINEERING FIRM:_____
>
> ENGINEER'S NAME:_____
>
> TITLE:_____
>
> SIGNATURE:_____
>
> DATE:_____AFFIX SEAL

D. In residential subdivisions, construction of the pad for all the lots within the floodplain shall be required as part of the subdivision improvements. Pads shall be built within the build able area of the lot prior to acceptance of street paving improvements, and the engineer shall file the following post construction certification with the Engineering Division, prior to acceptance of the street paving improvements:

> I certify that the finished floors or pads constructed on those lots within the designated flood zone on the grading plan have been constructed to

the elevations designated on the approved plans and that each pad is at or above the minimum elevations indicated by the design requirements.

ENGINEERING FIRM:_____

ENGINEER'S NAME:_____

TITLE:_____

SIGNATURE:_____

DATE:_____AFFIX SEAL

Section 11.090 Flood Retention Basins

A. The City has developed the following guidelines for minimum improvements of new flood retention basins. You will be required to adhere to this with staff review and inspections as specified.

1. The design engineer and developer are advised that all basin development and installations must be completed and accepted before the paving permit will be issued for the subdivision. (Plans should indicate who will eventually maintain landscaping after final acceptance by City. Refer to Subdivision Review Comments.)

2. All finished grades shall be in accordance with approved grading plans. All side slopes shall be 4:1 or steeper if not for public use. Bottom slopes shall be a minimum of one percent (1%).

3. All fills shall be compacted to eighty-five percent (85%) in six inch (6") compacted lifts and brought to optimum moisture content and thoroughly compacted. All rock over two and one-half inches (2-1/2") in any dimension, debris, rubbish, concrete or A.C. paving, shall be removed from the site prior to finish sub-grade.

4. All cuts shall be made in accordance with the plans. All cut areas shall be over-excavated to guarantee the replacement of a six inch (6") thick layer of topsoil.

5. All areas to receive grading (cuts or fills) shall be stripped of topsoil, which shall be stockpiled in an area adjacent to the site. The developer shall be responsible for making arrangements for storage and/or moving

of the topsoil prior to replacement on the site.

Section 11.100 Finish Grading

A. Upon acceptance of the subgrades by the City, the stockpiled topsoil shall be evenly spread over the entire graded area and dragged to uniform planes at proper grades. Sprinkler and utility trenches must be dug, completed and back-filled.

B. All grades shall be within a tolerance of 0.10 feet in flood irrigated areas and 0.25 feet in sloping or mounded areas, except where adjacent to curbs or sidewalks where the tolerance shall be one-half inch (1/2"). Grade shall be one and one-half inches (1-1/2") below curbs or sidewalks.

C. All areas to be seeded shall be fine graded. All turf areas shall be dragged and raked, removing all clods, rock, or concrete and debris, one inch (1") in any dimension. All soil shall be thoroughly water settled.

CHAPTER 12

GEOTECHNICAL AND SOILS REPORTS

SECTIONS:

SECTION 12.010 General Requirements - Single Family, Multiple Family, Commercial, Industrial, Public Works, and Subdivision Projects

A. All improvement plans for multiple family (duplex and above), commercial, industrial, public works, and subdivision projects, submitted to the Community Development Department for review by the Engineering Division, shall include a geotechnical and soils report in a separate bound folder. Said report and related plans shall follow the standards identified hereinbelow. A single family lot in a platted subdivision or a lot one acre or less will not be required to submit hydrology, geotechnical or soil reports.

1. Three copies of the report and any supporting plans, drawn at a scale of one inch equals forty feet (1" = 40'), or adjusted to produce an overall drawing of twenty-four inches by thirty-six inches (24"X36"). The drawings shall be readable, readily interpreted and sufficient for the purpose for which they were prepared.

2. Proposed name of project and its location by address and/or legal description.

3. Name, address and phone number of owner.

4. Name, address and phone number of engineer preparing the plan's.

5. Assessor's parcel number, legal description and address

6. Location map with reference to adjacent streets, north arrow, date, title, etc.

7. All proposed buildings, asphalt, grass, concrete or desert landscape and dimensions of same.

Section 12.020 Rules and Regulations

A. This chapter sets forth rules and regulations to control excavation, grading and earthwork construction, including fills and embankments; establishes the administrative procedure for issuance of permits; and provides for approval of plans and inspection of grading construction. The development and site construction shall be in compliance with the latest adopted edition of the Uniform Building Code.

CHAPTER 13

STREET LIGHTING STANDARDS AND SPECIFICATIONS

Sections:

Section 13.010 General Requirements

A. Street lights are installed to achieve a number of different objectives. These objectives vary in importance, depending on location. Arterial streets are lighted for traffic safety, residential streets for protection from theft and vandalism, while downtown shopping streets are lighted to make them more attractive for nighttime shoppers. These functions require widely varying light levels and different equipment to achieve the desired effect.

B. Street lights are also one of the most visible of all utility structures, therefore, every effort shall be made to design and build an attractive, consistent installation.

C. All developers of residential, commercial, and industrial subdivisions shall be responsible for the design, materials and installation of street lighting for the development per the current subdivision code, to include the development and implementation of a Lighting Improvement District.

Section 13.020 Street Light Plans

A. All improvement plans for single family, multiple family, commercial, industrial, and public works projects submitted to the Community Development Department for review by the Engineering Division, shall include street light plans which follow the standards identified hereinbelow.

1. Three copies of the plans, drawn at a scale of one inch equals forty feet (1" = 40'), or adjusted to produce an overall drawing of twenty-four inches by thirty-six inches (24" x 36"). The drawings shall be readable, readily interpreted and sufficient for the purpose for which they were prepared.

2. Proposed name of project and its location by address and/or legal description.

3. Name, address and phone number of owner.

4. Name, address and phone number of engineer and surveyor preparing the plans.

5. Assessor's parcel number, legal description and address.

6. Location map with reference to adjacent streets, north arrow, date, title, etc.

7. The location of any existing and proposed street lights, luminary types, luminary sizes, mounting heights, pole types and power sources for all streets within and/or adjacent to said development, along with the street address ("L-....").

B. All street lighting designs, materials and installations for public streets shall conform to the latest edition of the Bullhead City Procedures Manual.

C. All developers shall coordinate the lighting system design and electric service for the lighting system with the utility company servicing the lighting system. The developer shall conform to the latest requirements of the serving utility.

Section 13.030 Design Standards

A. Street lighting designs shall be in accordance with the standard details.

B. Spacing of street lights shall be based on light level requirements, type of street, right-of-way width of street, mounting height, type of luminary, and/or the illumination level requirements as listed in Table 1..

C. On all local streets within a residential subdivision, street lights shall be placed at each intersection, mid-block on any blocks which are six hundred feet (600') or more in length, at the radius of any cul-de-sacs which are three hundred feet (300') or more in length.

D. On all collector streets, regardless of their locations, street lights shall be placed at each intersection and every one hundred ninety feet (190') on one side of the street, preferably the south and west sides.

E. On all arterial streets, regardless of their locations, street lights shall be placed at each intersection and every two hundred feet (200') staggered on both sides of the street or within the median.

F. Final improvement plans for the development shall include street light location information for all streets within and/or adjacent to said development. Street light locations shall be shown on an overall layout plan of the development (may be the utility sheet) in addition to being shown on the individual plan sheets of the construction plans.

G. The standard detail and design specification drawings shall be incorporated into the development plans and shall be used for all applicable installations for street lighting.

H. All specification, workmanship, material and installation shall comply with the latest edition of the National Electric Code, except when superseded by City of Bullhead City regulations.

I. All finished pole foundations and junction boxes shall be constructed to grade.

J. The primary voltage rating shall be one hundred twenty volts (120v) for all street light connections.

K. There shall be a fuse at each junction box and at each pole base.

L. The subdivider shall use High Pressure Sodium (HPS) General Electric M-250A2 Cutoff Series (150W) street light fixtures, or the equal to such fixtures as approved by the City Engineer.

M. When sidewalks and lighting are temporarily waived (or have not been constructed yet), but driveways are constructed, a one-and one-quarter (1-1/4) inch diameter, P.V.C., Schedule 40 conduit shall be installed under the driveway for future electrical lighting or signal use.

N. If the power source as designated originates on or crosses private property, the developer shall install conduit, wire, pull-box, etc. according to the serving utility's instructions to a point of right-of-way acceptable by the serving utility and the City.

O. Should there be an overhead or underground conflict that interferes with the erection of the street lighting poles and their appurtenances, it shall be the developer's responsibility to resolve the conflict to the satisfaction of all involved parties at no expense to the City.

P. Different spacing and wattage may be approved by the Engineering Division if supported by a lighting study.

Q. Under no circumstances shall any street lighting or street lighting systems be installed without approval of the Engineering Division.

Section 13.040 Construction Requirements

A. It is the developer's responsibility to provide the Engineering Division with the appropriate list(s) of completed street light locations for which power is required.

B. Each street light pole and street light station shall be assigned an address number by the City Engineer during plan review. The developer shall be responsible for placing the address identification number on each street light pole and each street light station at the time they are installed.

C. All materials used shall be those identified hereinabove, and those materials shall be identified in writing and submitted to the Engineering Division for approval prior to their installation.

D. When the pole holes are dug, the contractor shall request the Engineering Division to perform an inspection of the pole hole depths, diameters, and locations for compliance with the submitted and approved plans. Upon approval of said items, the developer may pour concrete.

E. The developer shall also be responsible for requesting a final inspection from the Engineering Division upon completion of the street light installations within the subdivision.

F. All work, including trenching, installation of conduit and wire, splicing, wire make-up, etc., shall be done by a qualified electrical contractor (registered in the State of Arizona with a General A, L - 11, or A - 17 license) or under his supervision, and it shall be the responsibility of the developer to ensure adherence of the electrical work to approved plans and established standard specifications and ordinances.

G. The developer shall be responsible for the cost of street lights, including design, installation, electricity, and maintenance (until such time as an improvement district is formed).

H. The developer shall be responsible for depositing a completion bond in an amount established by the Engineering Division and approved by the City Manager, or have deposited with the City, sufficient funds to cover the cost of such improvements per the Bullhead City Municipal Code.

TABLE 1

Street Type	Luminaire	Maximum Average Foot Candles	ROW Width	Mounting Height	Maximum Pole Spacing	Pole Locations
Local	9,500 Lumen (150W) HPS	NA	60'	30'	600'	At each intersection, mid-block on any blocks 600' or more & at the radius on cul-de-sacs 300' or more.
Collector	9,500 Lumen (150W) HPS	.4	70'	30'	190'	One Side
Arterial	26,500 Lumen (150W) HPS	.7	84'	35'	200'	Both sides staggered or within the median.

CHAPTER 14

PARKING AND PAVING

Sections:

Section 14.010 Parking Standards

A. All parking areas shall be maintained dust free, which shall consist of masonry, concrete or asphalt paving and shall include the area of all drives and accesses to parking spaces and be connected to a public street or alley by a paved driveway.

B. All required parking spaces, except as provided for hereinbelow, shall be 9 ft. x 20 ft.

C. Where off street parking requirements exceed twenty (20) spaces for a commercial development, the following minimum requirements may be complied with:

1. The first twenty (20) parking spaces shall measure 9 ft. by 20 ft.

2. Twenty percent of the remaining required parking spaces may be reduced in size to 7 ft.6 in. by 15 ft. Aisles and access ways shall be maintained as stipulated below.

D. The following are the minimum driveway widths permitted on-site:

1. One-way drives: 12 ft.

2. Two-way drives: 24 ft. required for 90 degree parking

3. Fire lanes: 24 ft.

4. Private driveways shall be 24 ft. to 30 ft. wide and commercial driveways shall be a 24 ft. to 36 ft. wide as determined by the review process.

E. No structure shall be occupied or used until off street parking is installed and an occupancy permit has been issued as required by Title 17 of the Bullhead City Municipal Code.

F. A permit will be required to restripe an existing parking lot after seal coating, overlay or reconstruction. The striping shall comply with the requirements of Chapter 14.

Section 14.020 Handicap Parking

A. In accordance with A.R.S. Sections 34-403 and 34-405, handicap parking spaces shall be provided at all public buildings and facilities, and in all places of public accommodation. Places of public accommodation mean all public places of entertainment, amusement or recreation, all places where food or beverages are sold for consumption on the premises, all public places which are conducted for the lodging of transients or for the beneficial use or accommodation of those seeking health or recreation and all establishments which cater or offer their services, facilities or goods to, or solicit patronage from, the members of the general public. Any residential, house or residence in which less than five rooms are rented, or any private club, or any place which is its nature distinctly private, is not a place of public accommodation.

1. Two percent of the required parking spaces for a public building facility or place of public accommodation shall be reserved for handicap parking and shall have a minimum of one handicap parking stall.

2. A handicap parking stall shall be 8 ft. wide and 20 ft. deep, with 8 ft. wide access aisle. Handicap parking spaces should also be designed and located in such a manner as to prevent persons in wheel chairs and persons using braces and crutches from having to wheel or walk behind parked cars.

3. Where the level of the parking lot differs from the level of the walk or entrance way of a public building, ramps shall be provided in accordance with the specifications outlined in A.R.S. Sections 34-305 and 34-406.

4. Each handicap parking space shall be identified as such by a sign displaying the international wheelchair symbol and by displaying the international wheelchair symbol on the parking surface.

CHAPTER 15

INSPECTION OF IMPROVEMENTS

Sections:

Section 15.010 Single Family, Multiple Family, Commercial, Industrial, and Public Works Projects

A. The City shall perform observe the required improvements during construction.

B. The owner/developer shall provide all testing required to insure proper materials are being installed. These test results shall be made available to the City during the construction of the project for the use of the City inspectors. If City inspection and test results indicate that any of the required improvements have not been constructed in accordance with the approved plans and City standards and specifications, the owner/developer shall be responsible for correcting and completing the improvements according to the plans and specifications.

C. After completion of improvements, the developer shall furnish the Engineering Division, a set of the improvement plans, that shall show the as built horizontal and vertical location of the improvements for review. The plans shall be certified by an Arizona registered engineer and will become a permanent part of the City file.

D. Upon receipt of the "As-Built" plans, the Engineering Division shall review the plans and coordinate resolution of his comments with the design engineer. The Building Division shall be advised of the Engineering Division's findings and status of the project.

Section 15.020 Subdivision Projects

A. The City shall observe the required improvements during construction.

B. The owner/developer shall provide all testing required to insure proper materials are being installed. These test results shall be made available to the City during

the construction of the project for the use of the City inspectors. If City inspection and test results indicate that any of the required improvements have not been constructed in accordance with the approved plans and City standards and specifications, the owner/developer shall be responsible for correcting and completing the improvements according to the plans and specifications.

C. After completion of improvements, the developer shall furnish the Engineering Division, a set of the improvement plans, that shall show the as built horizontal and vertical location of the improvements for review. The plans shall be certified by an Arizona registered engineer and will become a permanent part of the City file.

D. Upon receipt of the as built plans, the Engineering Division shall review the plans and coordinate resolution of his comments with the design engineer. The Planning and Zoning Division shall be advised of the Engineering Division's findings and status of the project.

E. When the Engineering and Public Works Divisions have approved the required improvements and "As-Built" drawings, the Planning and Zoning Division shall make arrangements for the City Council to accept those improvements into the City maintenance program and release the financial assurances to the subdivider.

CHAPTER 16

AS-BUILTS

Section:

Section 16.010 General Requirements

A. All "As-Builts" drawings submitted to the Community Development Department for review by the Engineering Division, shall follow the standards of the items identified hereinbelow.

1. The City requires a set of "As-Built" drawings which represent the nature, locations and dimensions of the improvements which the City will accept for ownership and maintenance.

2. Drawings with revised .DXF and COGO files, as appropriate, shall be submitted for review and concurrence upon completion of the work.

3. One set of drawings must be provided on photo-mylar copies of the original drawings. Each photo-mylar copy should be made from a photographic negative unless the original drawings are in good shape. The mylar film should be at least three mils thick. The "As-Built" drawing certificate must be placed on the drawing. All copies shall be stamped and signed. The certificate must be signed and stamped by an Arizona registered professional engineer.

4. "As-Built" drawings shall reflect all changes from the approved plans to include the following:

   a. Elevations.
   b. Drainage channels and drainage structures.
   c. Retention works.
   d. Curbing and sidewalks.
   e. Fences and retaining walls.
   f. Driveways and parking.
   g. Sewer inverts.
   h. Sewer laterals.
   i. Sewer manholes, valves.

j. Street Lights.
k. Survey monuments.

5. Right-of-way construction permits will not be released, nor any type of construction accepted, until "As-Built" drawings have been submitted to and approved by the City Engineer.

Section 16.020 Typical Minimum Confirmation Requirements

A. Drainage Plans

1. Elevations at all drainage control points (i.e., retention overflow point, tops and bottoms of retention basins, dry well rim, valley gutters, curbs).

2. Dimension of all retention areas.

3. Retention calculations, where the as-constructed dimensions differ significantly less then the approved plans.

4. First floor or pad elevations (in floodplain, show lowest floor).

5. Location of all structures (i.e., buildings within fifty feet (50') of top/toe of all slopes.)

B. Grading Plans

1. Original ground surface elevations, "As-Built" ground surface elevations, lot drainage patterns and locations and elevation of all surface and subsurface drainage facilities.

2. It shall be stated that to the best of his/her knowledge, the work was done in accordance with the final approved grading plan, with the exception of those items noted on the drawings.

C. Irrigation and Storm Drains

1. Street centerline stations and offset dimension to the main at all changes in alignment and/or changes in grade.

2. Top and invert elevations for all structures.

3. Show hydraulic grade line on the profile.

D. Sewer Plans

1. Sewer or street centerline stations and offset dimension from street centerline to main at manholes and all changes in alignment.

2. Sewer line station at centerline of each manhole.

3. Rim and invert elevation for each manhole.

4. Calculated slope between manholes.

5. Sewer line stationing at centerline of each service tap at 90° to the main from the nearest downstream manhole. If not installed at 90° to the main, show the station and offset to the end of each service tap. (Note: At least every other front property corner must be visible to verify information for record drawing approval.)

6. Sewer lateral locations.

E. Street Plans

1. Station for all grade breaks.

2. Bearing and dimensions along centerline.

3. Face of curb dimension at all changes in alignment.

4. Top of curb, gutter and pavement centerline elevations at all grade breaks, curb returns and valley gutters, plus any other location necessary to adequately show drainage patterns.

5. Survey monuments.

6. Location of street lights.

F. Water Plans

1. Street centerline station and offset dimension to:

   a. All fire hydrants and fittings (i.e., valves).

   b. Main at all changes in alignment.

c. All horizontal control points (i.e., centerline intersects, pc, pt).

d. Station and elevations given at all vertical water line alignment changes for 12 in. and larger, if other water lines have consistent cover.

e. Centerline station and offset to each service tap, size of tap (or dimension to nearest side property line). (Note: At least every other front property corner must be visible to verify information for record drawing approval.)

f. Centerline station, offset and elevations to all changes in vertical alignment (i.e., dips, bends, etc.) are required to avoid conflicts with other utilities.

Section 16.030 Certifications

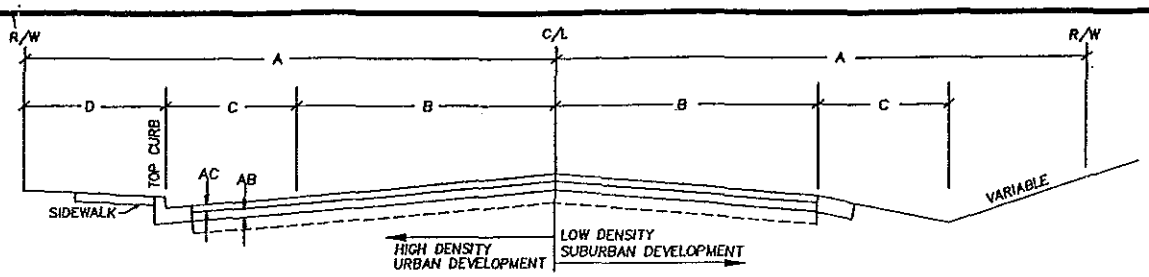
A. All "As-Built" drawings shall contain the statements shown below. The "As-Built" drawing statement (unsigned) shall be placed on the cover sheet prior to the time the plans are submitted for approval. If the statement is not placed on the cover sheet at that time, a space must be left on the cover sheet for the statement so it may be placed there when the record drawings are being prepared for submission. The "As-Built" drawing statement should be placed on the lower right-hand quadrant of the cover sheet near the approval block.

1. I hereby state that the "As-Built" drawing information shown hereon was obtained under my direct supervision and is in substantial conformance with the design shown hereon.

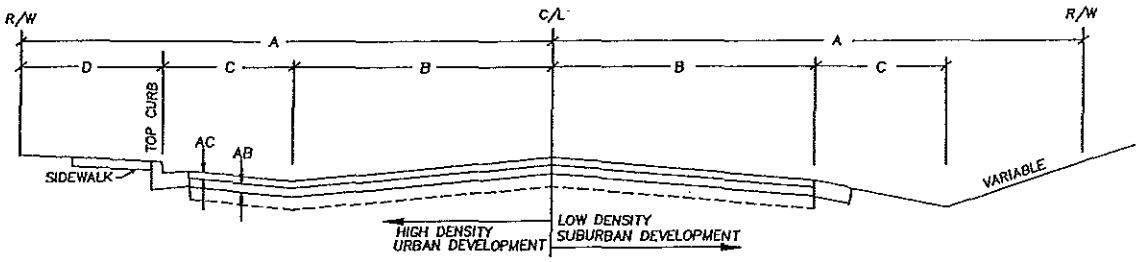
Name: _____ (Seal)

*Registration No.: _____ Date: _____

* May be included in seal



STANDARD SECTION



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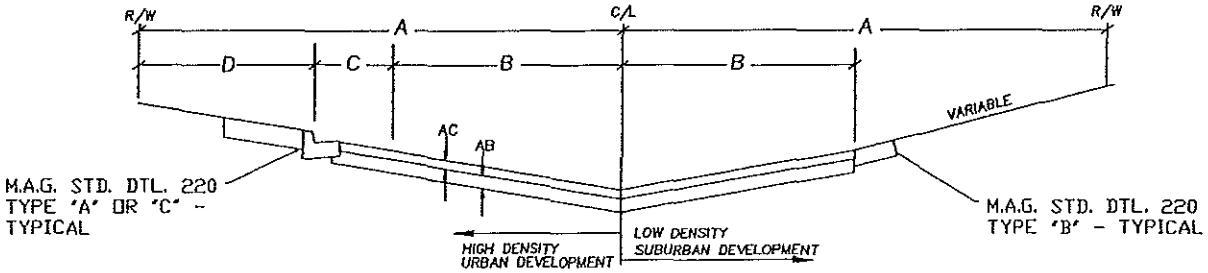

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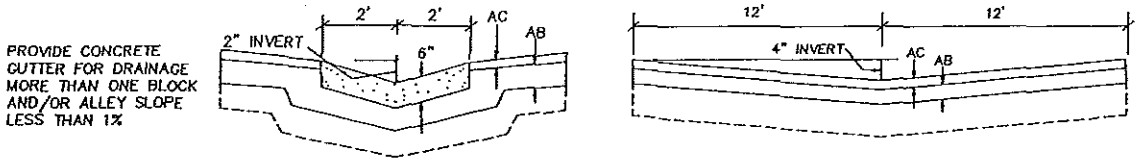


ALLEY SECTION

STREET TYPE	R/W RANGES	MAX. LENGTH
MAJOR ARTERIAL	110--130	-
MINOR ARTERIAL	84--110	-
COLLECTOR	70--84	-
LOCAL STREET	60	-
CUL-DE-SAC	60	600
LIMITED USE STREET	60	3000**

R/W WIDTHS	A	B	C	D	AC	AB
130	65	30	20	15	*	*
110	55	30	8	17	*	*
84	42	18	8	16	4"	*
70	35	12	10	13	3"	*
60	30	12	4	14	2"	6"

ALL DIMENSIONS IN FEET UNLESS OTHERWISE SHOWN

* PER SOILS ENGINEER

** W/ NO OTHER FUTURE OUTLET POSSIBLE, LOS C OR BETTER

1. SUB-GRADE COMPACTION SHALL BE PER SOILS REPORT OR AS REQUIRED BY CITY ENGINEER.
2. ALL STREETS SHALL BE BUILT WITH CURB, GUTTER AND SIDEWALK UNLESS APPROVED OTHERWISE BY CITY ENGINEER.
3. CROSS SLOPE ON STREETS SHALL BE A MINIMUM OF 2% AND A MAXIMUM OF 4%.
4. SIDEWALK TYPE SHALL BE PER MAG DETAIL 230.
5. STRIPING REQUIREMENTS SHALL BE AS REQUIRED BY CITY TRAFFIC ENGINEERING DEPARTMENT.
6. STREET SHALL BE DESIGNED TO CARRY EXPECTED STORMWATER RUNOFF WITHIN RIGHT OF WAY.
7. SECTIONS AC & AB SHOWN MAY BE CHANGED UPON APPROVAL BY THE PUBLIC WORKS DIRECTOR WITH A RECOMMENDATION BY A REGISTERED SOILS ENGINEER.
8. ASPHALT AT EDGE OF CONCRETE GUTTER SHALL BE PLACED 1/8" HIGHER THAN EDGE OF GUTTER.

ADOPTED BY CITY COUNCIL RESOLUTION		CITY OF BULLHEAD CITY	DATE 12/97
98R-056	2. REVISED ALLEY WIDTH TO 24' 1. ADDED LTD. USE STR. & MAX LENGTH TO DATA BOX & CHG. NOTE 7. 8-1-94	STANDARD DETAIL STREET SECTIONS	10.1
	REVISION DATE		

STREET CLASSIFICATIONS AND X-SECTION DESIGN STANDARDS

STREET CLASS	ROW/ CURB TO CURB	TYPICAL SECTION (PARKING TRAVEL LANES)	PARKWAY WIDTH (FT)	THRU LANES	DESIGN CAPACITY (A.D.T.)	TRAFFIC INDEX	BUS BAY WIDTH (FT.)	RIGHT TURN LANE WIDTH (FT.)	MIN. A.C. THICKNESS (IN.)
EXPRESSWAY AND MAJOR ARTERIAL	130/100	8/ 13/ 13/ 4/ 24/ 4/ 13/ 13/ 8	15	4	40,000	8	10	12	5
DIVIDED MAJOR ARTERIAL W/ TURN LANES	110/76	15/15/16/15/15	17	4	30,000	8	10	12	5
DIVIDED MAJOR ARTERIAL W/ BICYCLE AND TURN LANES	110/76	6/ 12/ 12/ 16/ 12/ 12/ 6	17	4	30,000	8	10	12	5
MINOR ARTERIAL	110/76	8/ 12/ 12/ 12/ 12/ 12/ 8	17	4	30,000	7	N/A	12	4
MODIFIED MINOR ARTERIAL	84/52	13/13/13/13	16	4	20,000	7	N/A	12	4
INDUSTRIAL COLLECTOR	84/52	8/12/12/12/8	16	2	10,000	6	N/A	N/A	3
COLLECTOR	70/44	10/12/12/10	13	2	10,000	6	N/A	N/A	3
GENERAL LOCAL	60/32	4/ 12/ 12/ 4	14	2	N/A	5	N/A	N/A	2
LIMITED USE	60/32	4/12/12/4	14	2	N/A	4	N/A	N/A	2

NOTES:

1. UTILITY FACILITIES AND FIRE HYDRANTS SHALL BE LOCATED OUTSIDE SIDEWALK AREAS.
2. PARKING SHALL BE ELIMINATED AT INTERSECTIONS TO ACCOMODATE TURN LANES.
3. MINIMUM UTILITY COVER IN STREET AREAS IS 36 INCHES.
4. SIGHT DISTANCE REQUIREMENTS ARE APPLICABLE AT ALL INTERSECTIONS.
5. SIDEWALK WIDTHS SHALL BE 4 FEET FOR RESIDENTIAL AND 5 FEET FOR COMMERCIAL.
6. A STRIPING PLAN SHALL BE REQUIRED FOR COLLECTORS AND ARTERIALS.

ADOPTED BY CITY COUNCIL RESOLUTION 98R-056

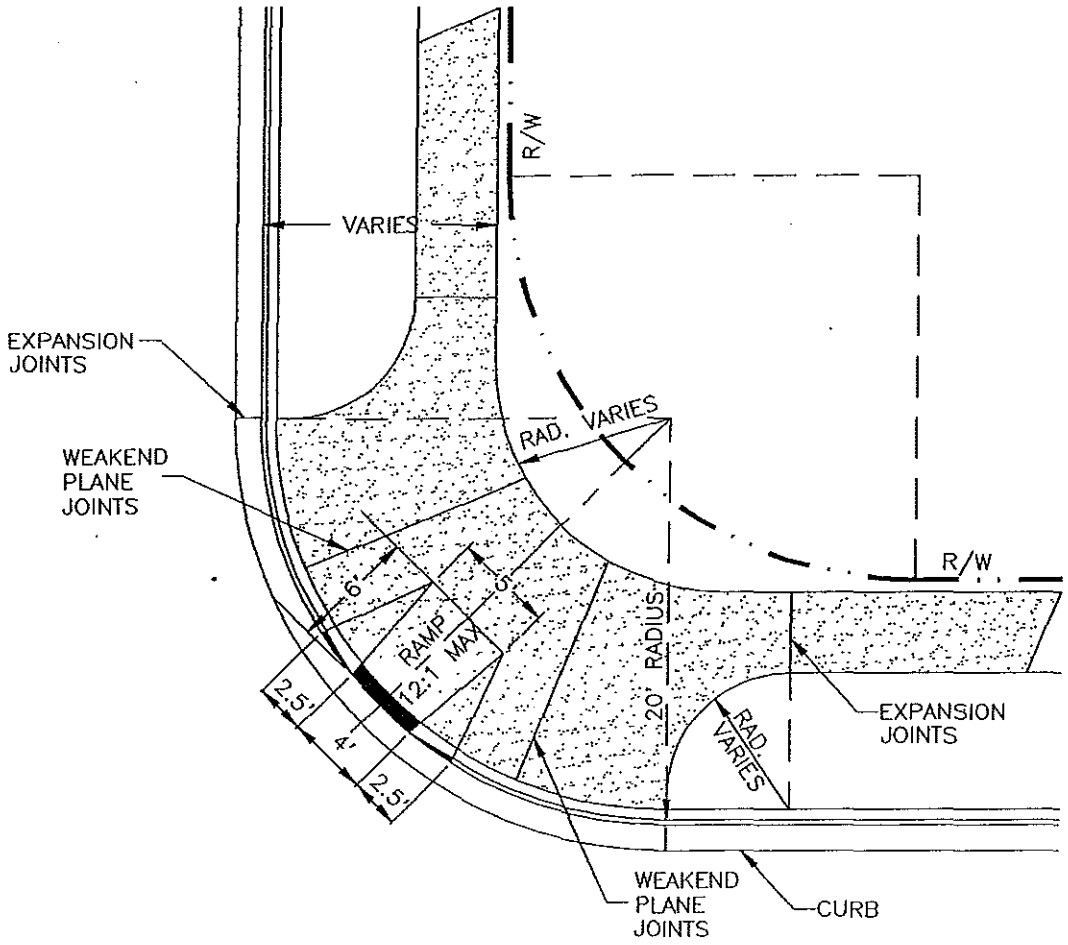
REVISION DATE

CITY OF BULLHEAD CITY

STANDARD DETAIL
STREET CLASSIFICATION AND X-SECTION DESIGN STANDARDS

10.2

DATE 12/97



NOTES:

Ramps shall be built and finished so that there are no abrupt changes in elevation or angle of slope.

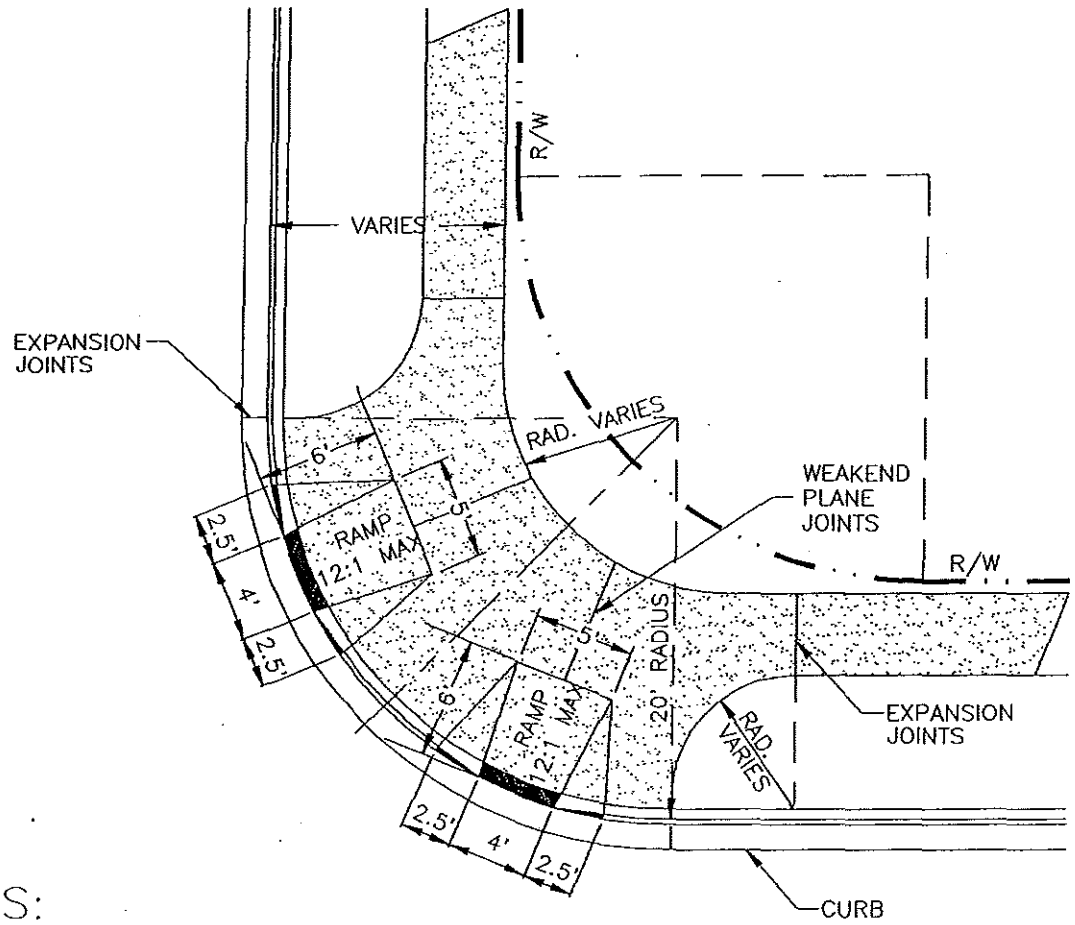
Ramps shll be constructed with a heavy broom finish transverse to the axis of the ramp.

Sidewalk ramps are required at all corners where curbs and/or sidewalks are to be constructed or reconstructed and shall be as shown on the improvement plans.

Modifications to location or dimensions of ramp shall require approval of City Engineer and be shown on approved plans.

Thinckness of concrete: 4 in. Minimum.

OPTED BY CITY CIL RESOLUTION		CITY OF BULLHEAD CITY	DATE
98R-056	REVISION DATE	STANDARD DETAIL SIDEWALK RAMP TYPE I	20.1



NOTES:

This standard shall be used on Commercial, Signaled, and high pedestrian travled intersections.

Ramps shall be built and finished so that there are no abrupt changes in elevation or angle of slope.

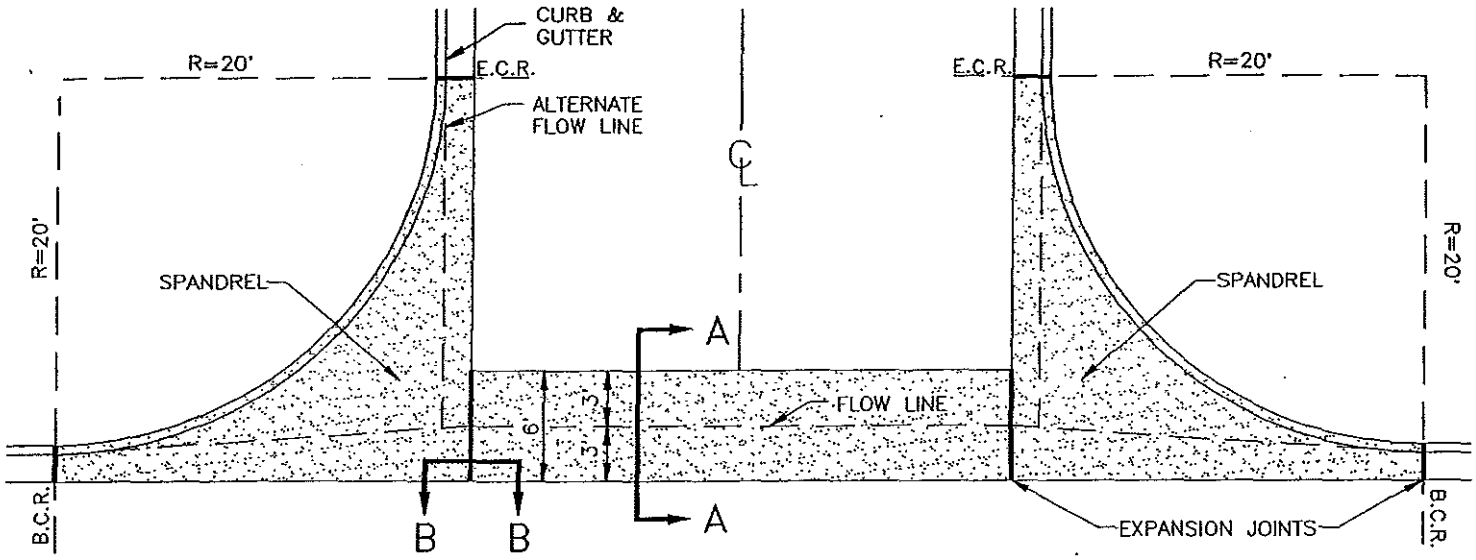
Ramps shll be constructed with a heavy broom finish transverse to the axis of the ramp.

Sidewalk ramps are required at all corners where curbs and/or sidewalks are to be constructed or reconstructed and shall be as shown on the improvement plans.

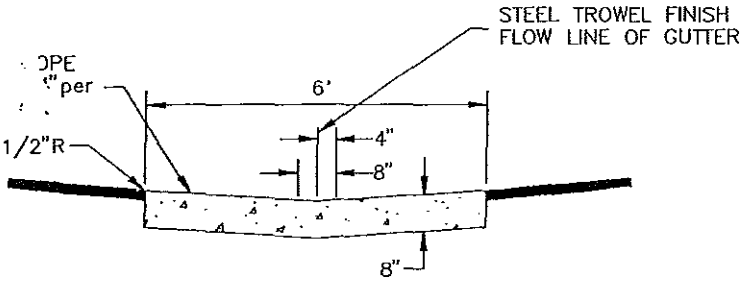
Modifications to location or dimensions of ramp shall require approval of City Engineer and be shown on approved plans.

Thinckness of concrete: 4 in. Minimum.

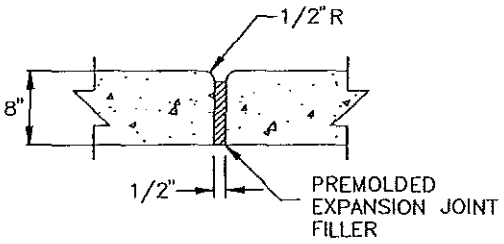
OPTED BY CITY CIL RESOLUTION		CITY OF BULLHEAD CITY	DATE
98R-056		STANDARD DETAIL SIDEWALK RAMP TYPE II	20.2
	REVISION DATE		



PLAN VIEW



SECTION A–A

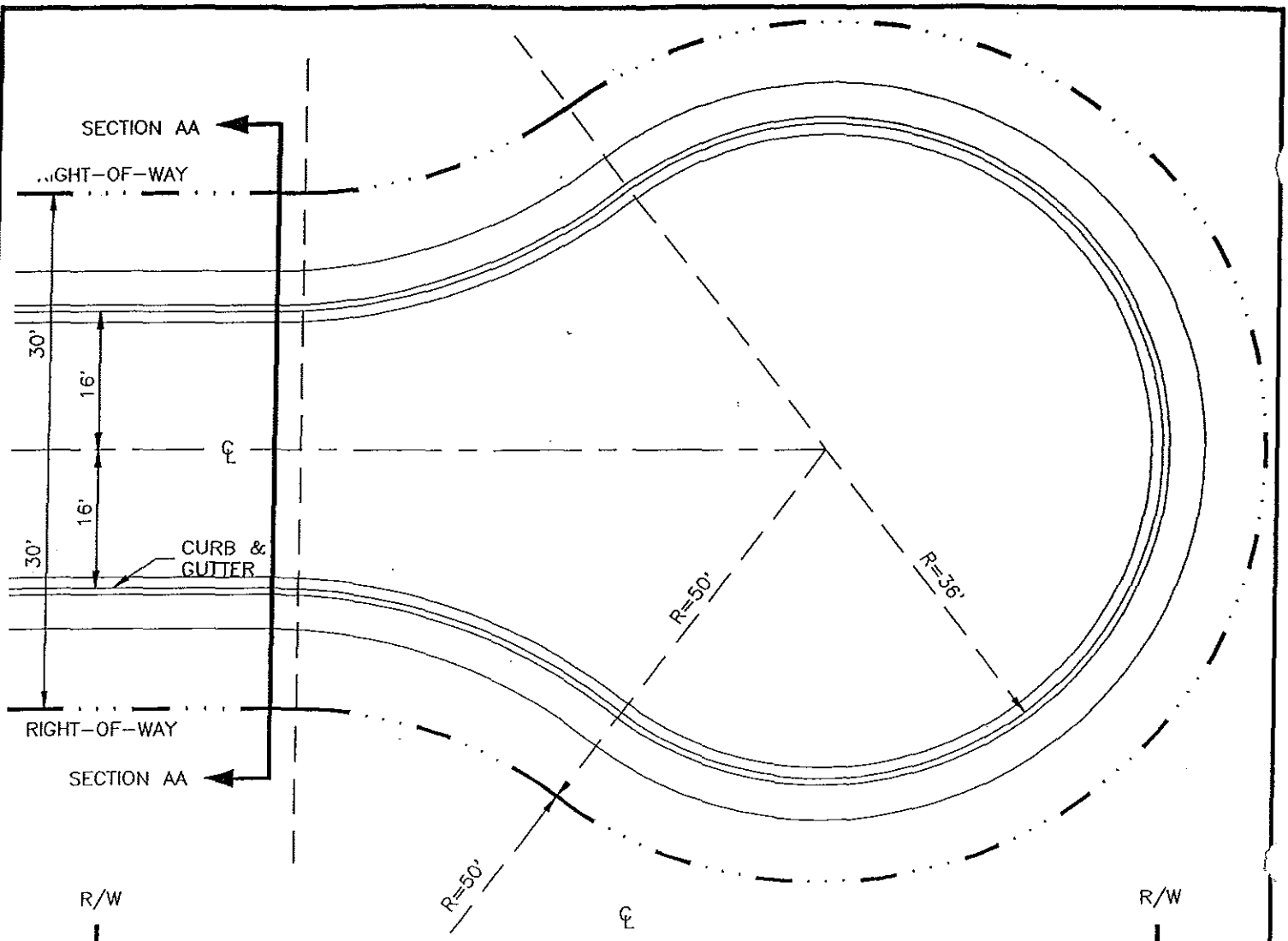


SECTION B–B

NOTES:

1. Cross Gutter shall be constructed of class "B" concrete.
2. The straight grade between B.C.R.'s may be altered on an excessive grades.
3. A 0.3' minimum fall is required between E.C.R. and cross gutter flowline.
4. Spandrel shall be 8" thickness class "B" concrete.
5. Variable curb face allowed for drainage purposes.

DOPTED BY CITY NCIL RESOLUTION		CITY OF BULLHEAD CITY	DATE 12/97
98R–056	REVISION DATE	STANDARD DETAIL CROSS GUTTER	20.3

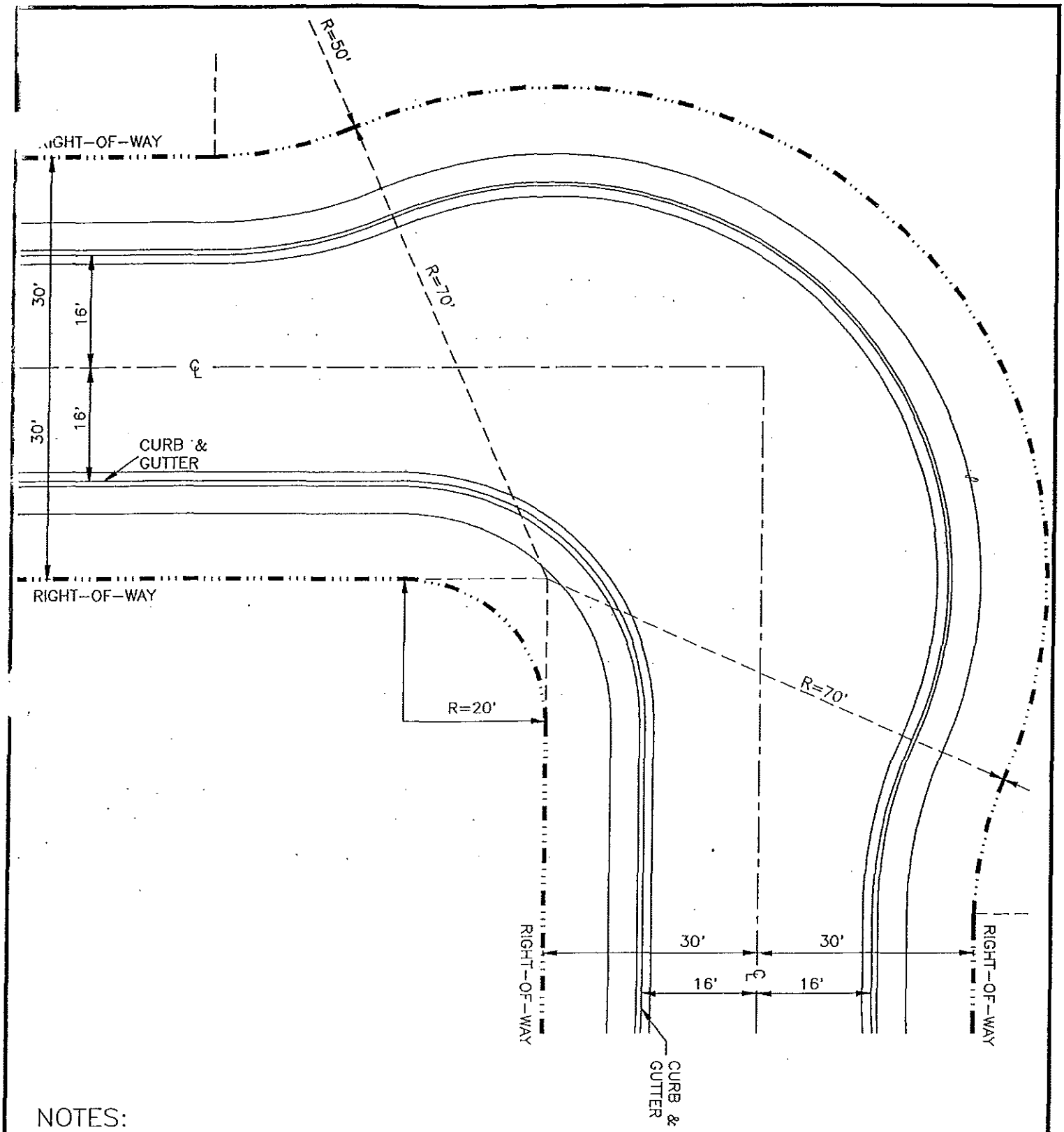


TYPICAL SECTION AA

NOTES:

1. Structural section of roadway shall be determined soils tests and so indicated on construction plans.
2. Construction outside R/W line shall require slope easements.
3. 0.2% grade min. on gutter of bulb.

ADOPTED BY CITY COUNCIL RESOLUTION		CITY OF BULLHEAD CITY	DATE
98R-056	REVISION DATE	STANDARD DETAIL CUL-DE-SAC	20.4

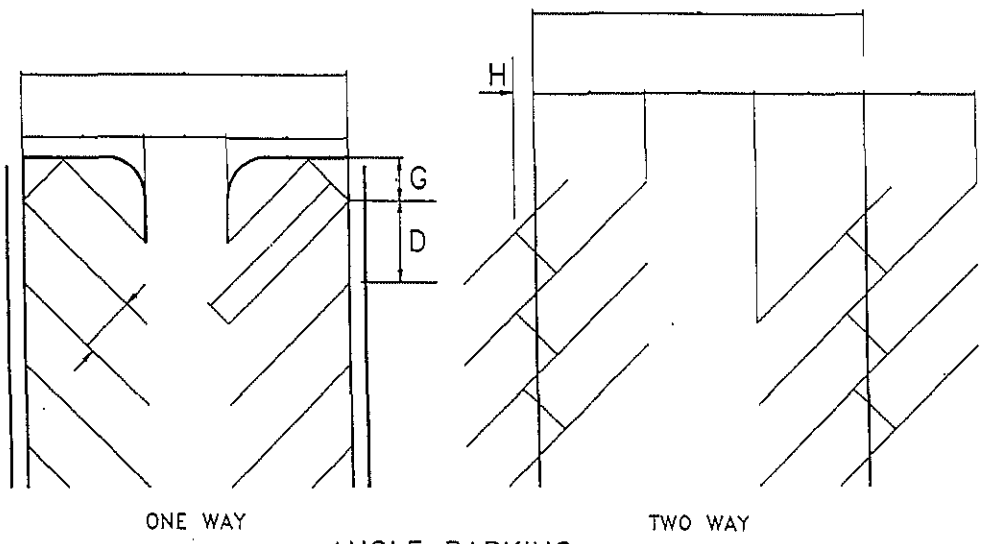


NOTES:

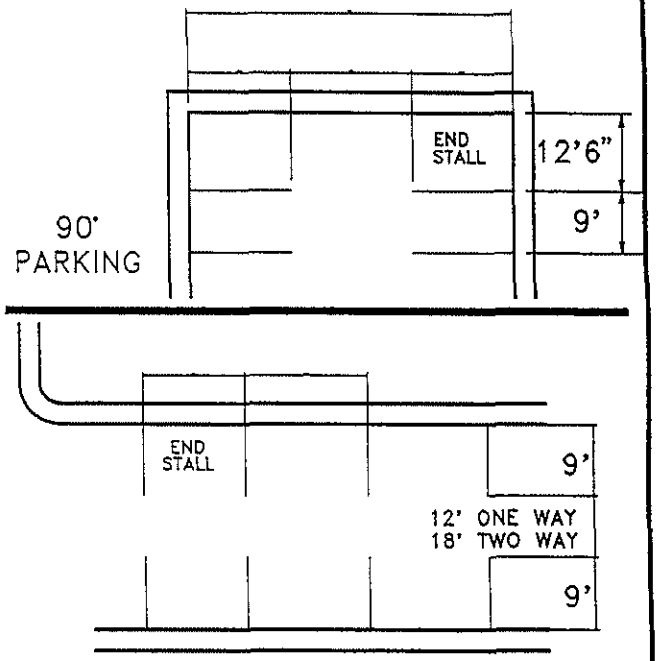
1. Minimum 0.20% on all horizontal curve grades.
2. See standard for typical section.

ADOPTED BY CITY COUNCIL RESOLUTION		CITY OF BULLHEAD CITY	DATE 12/97
98R-056	REVISION DATE	INTERSECTION DESIGN "L" SHAPE	20.5

SUGGESTED PARKING ARRANGEMENTS



ANGLE PARKING



PARALLEL PARKING

	ONE WAY			TWO WAY							
	A	B	C	A1	B1	C1	D	E	F	G	H
ANGLE OF PARKING	DEPTH OF STALL	AISLE WIDTH	WIDTH OF AREA	DEPTH OF STALL	AISLE WIDTH	WIDTH OF AREA	CURB LENGTH	WIDTH OF STALL	LENGTH OF STRIPE		DEPTH OF OVERHANG
30°	17'-10"	12'-0"	47'-8"	13'-11"	18'-0"	45'-10"	18'-0"	9'-0"	35'-7"	4'-6"	3'-11"
45°	20'-6"	13'-0"	54'-0"	17'-4"	18'-0"	52'-8"	12'-9"	9'-0"	29'-0"	6'-4"	3'-2"
60°	21'-10"	18'-0"	61'-8"	19'-7"	18'-0"	57'-2"	10'-5"	9'-0"	25'-2"	7'-9"	2'-3"

ADOPTED BY CITY COUNCIL RESOLUTION
98R-056

REVISION DATE

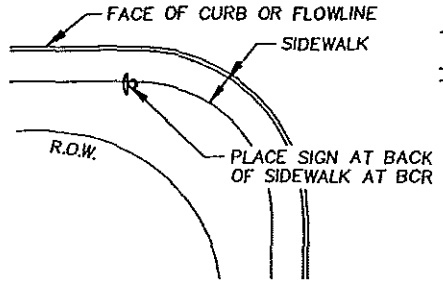
CITY OF BULLHEAD CITY

STANDARD DETAIL

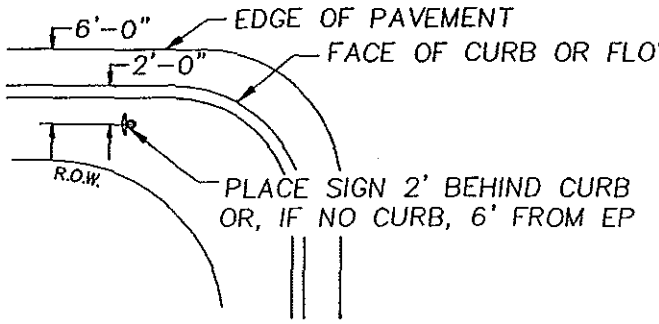
SUGGESTED PARKING ARRANGMENT

30

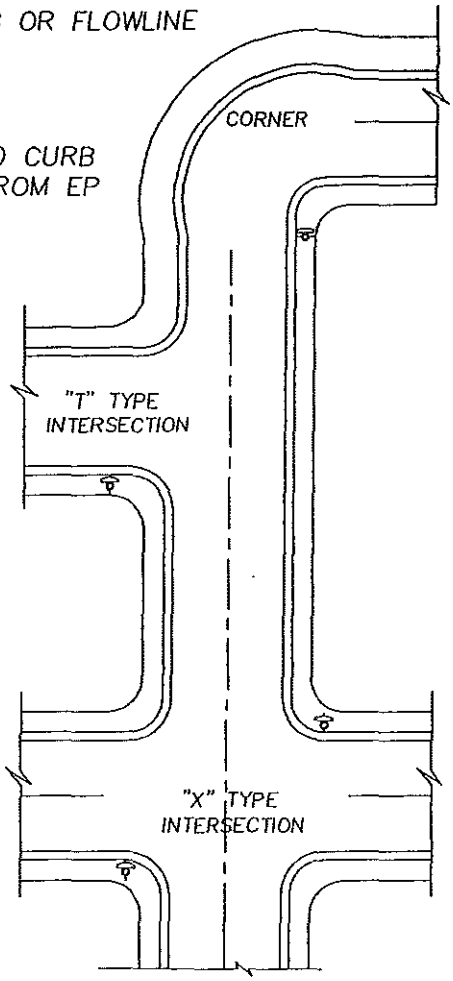
DATE 12/97



STREET SIGN WITH STOP SIGN IMPROVED CORNER

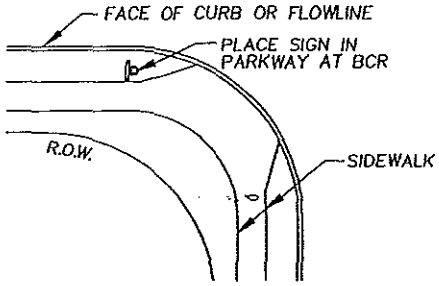


STREET SIGN WITH STOP SIGN UNIMPROVED CORNER

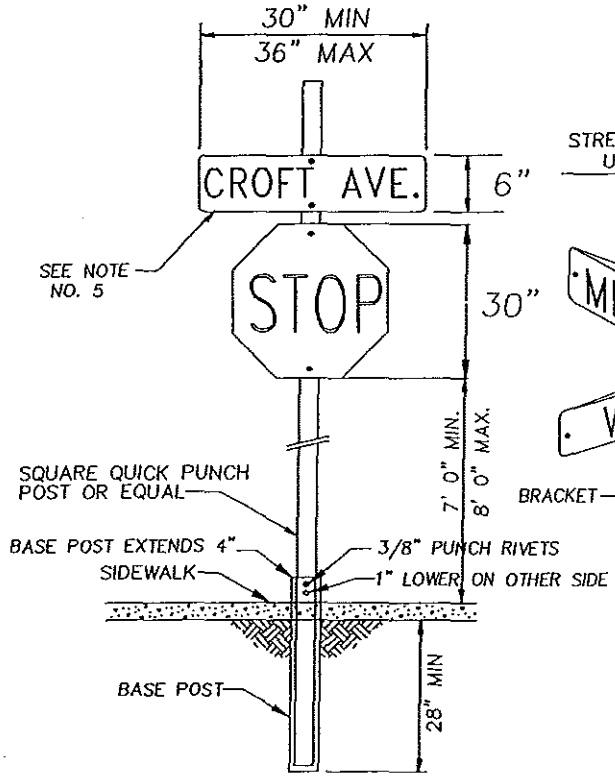


SIGN POST PLACEMENT

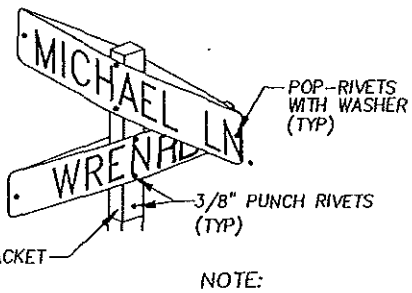
TYPICAL LOCATIONS OF STREET SIGN POST



STREET SIGN WITH STOP SIGN UNIMPROVED CORNER



SIGN POST DETAIL



STANDARD HARDWARE SIZES

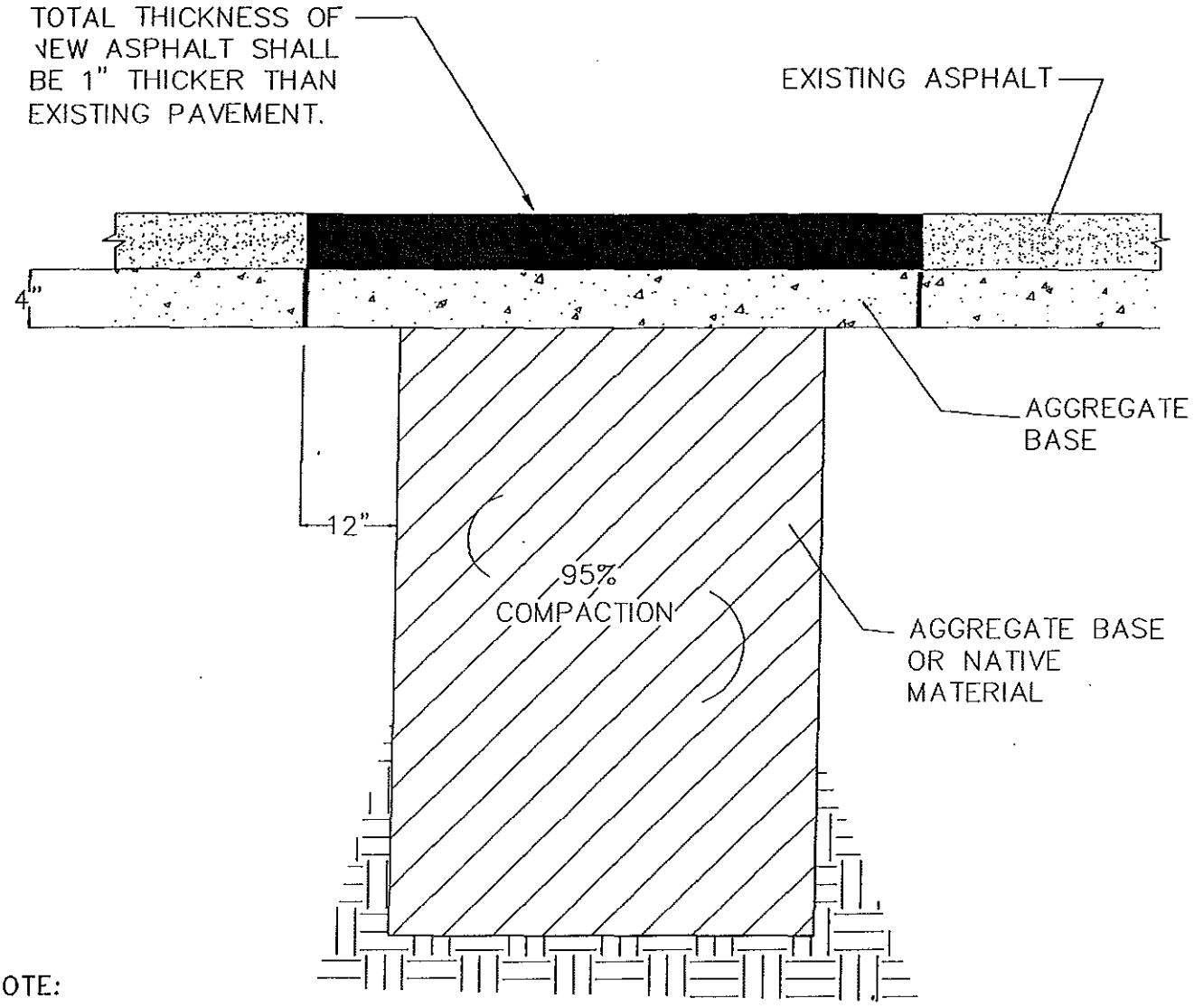
ITEM	RESIDENTIAL/ LOCAL STREET	ARTERIAL/ COLLECTOR STREET
BASE POST:	2" X 2"	2.25" X 2.25"
POST:	1.75" X 1.75"	2" X 2"
BRACKET:	2" X 2" X 16"	2.25" X 2.25" X 16"

NOTE:

1. MARKER TO BE SET ON CITY RIGHT OF WAY
2. MARKERS SHALL BE VISIBLE FROM 150 FEET
3. IF ANOTHER SIGN IS PLACED ON POST THE POST SHALL BE LONG ENOUGH TO PROVIDE A MIN. 7' 0" & MAX. 8' 0" HEAD CLEARANCE.
4. STREET MARKERS LOCATED AT MAJOR ROADS WILL BE MOUNTED ON 12' POSTS TO ACCOMODATE STOP SIGN
5. LETTERS AND NUMERALS ARE TO BE 4" REFLECTIVE WHITE ON A REFLECTIVE GREEN BACKGROUND
6. ROADS WITH 4 OR MORE LANES WILL BE MARKED ON ADDITIONAL CORNERS
7. BRACKET, POST AND BASE POST SHALL BE "QUICK PUNCH" OR APPROVED EQUAL WITH 3/8" PUNCH RIVETS. SIGN PANEL SHALL BE "3M REFLECTIVE SHEETING, EGINEER GRADE", OR APPROVED EQUAL, ON 12 GA. ALUMINUM PLATE.
8. THE BASE POST IS DRIVEN INTO THE GROUND, THE POST INSTALLED, THEN THE SIGNS SHALL BE RIVETED TO HELP PREVENT VANDALISM.
9. QUESTIONS REGARDING SIGN TYPE OR PLACEMENT SHOULD BE DIRECTED TO THE PUBLIC WORKS DEPT, PRIOR TO CONSTRUCTION.

OPTED BY CITY INCIL RESOLUTION 98R-056	REVISION DATE	CITY OF BULLHEAD CITY	DATE 12/97
		STANDARD DETAIL INSTALLATION DETAILS STREET SIGN & LOCATION	40.1

NOTE: CONTRACTOR TO CALL FOR INSPECTION BEFORE PAVING.

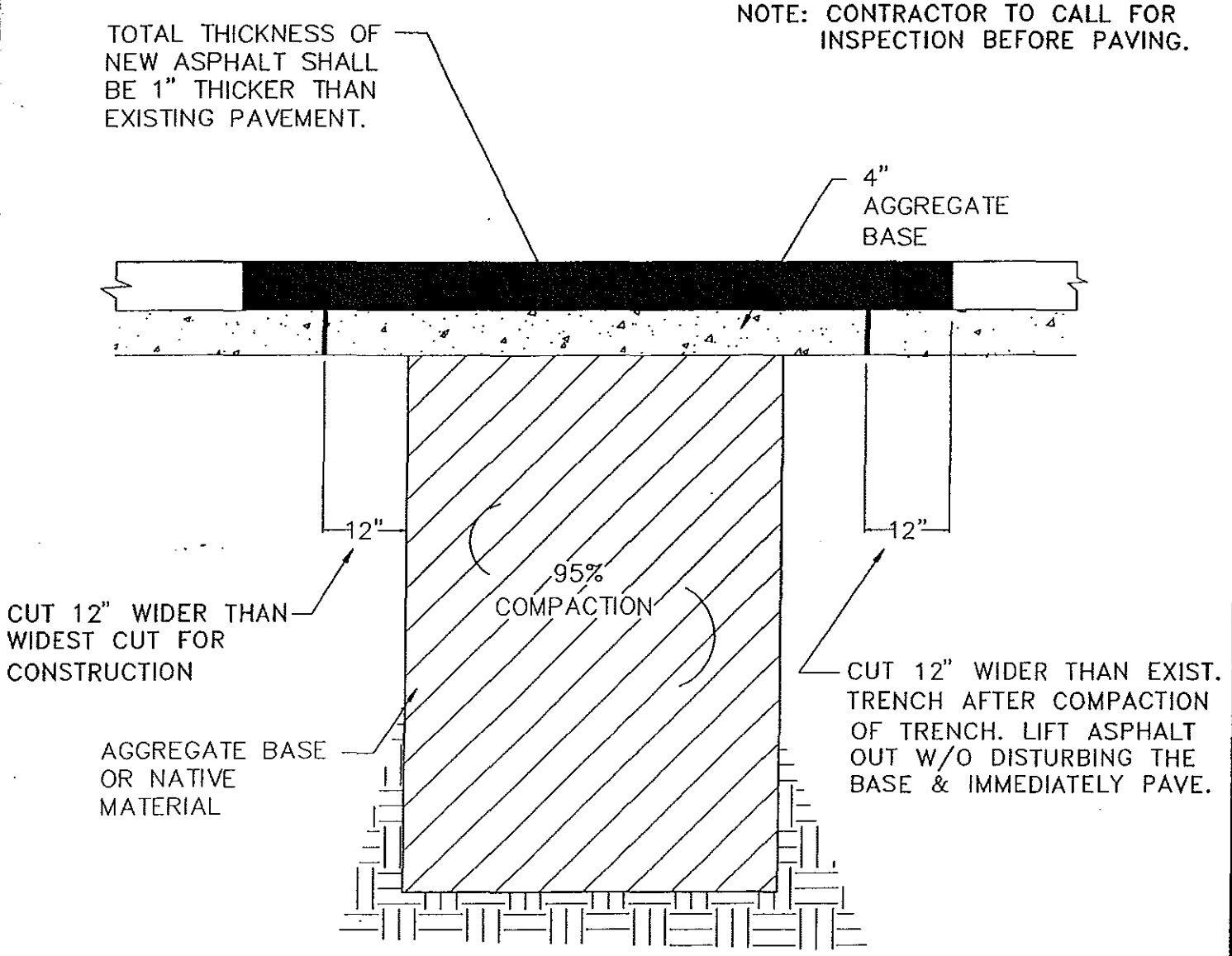


NOTE:

1. TACK–COAT VERTICAL EDGES PRIOR TO PLACING NEW HOT ASPHALT.
2. ALL TRENCH NOT IN ROAD WAY SHALL BE COMPACTED TO 90% COMPACTION EXCEPT TRENCH UNDER PROPOSED SIDEWALK.
3. TACK COAT SHALL BE SS1H (1to1).
4. ASPHALT SHALL BE D 1/2 PER M.A.G. SPECIFICATIONS.
5. ANY TRENCHING PERMITTED BY THE CITY ENGINEER IN AN ASPHALT PAVED STREET SHALL BE TESTED FOR COMPACTION BY CONTRACTOR AND THE RESULTS OF OF THE TEST SHALL BE SUBMITTED TO THE CITY ENGINEER FOR REVIEW OF CONFORMANCE AS PER M.A.G. SPECIFICATIONS.
6. MARKING TAPE REQUIRED ABOVE ALL ABS OR PVC PIPE.

"PTED BY CITY CIL RESOLUTION		CITY OF BULLHEAD CITY	DATE 12/97
98R–056	REVISED ORDINANCE NO. 97–852 5/15/97	STANDARD DETAIL	50.1
	REVISION DATE	STREET TRENCH DETAIL	

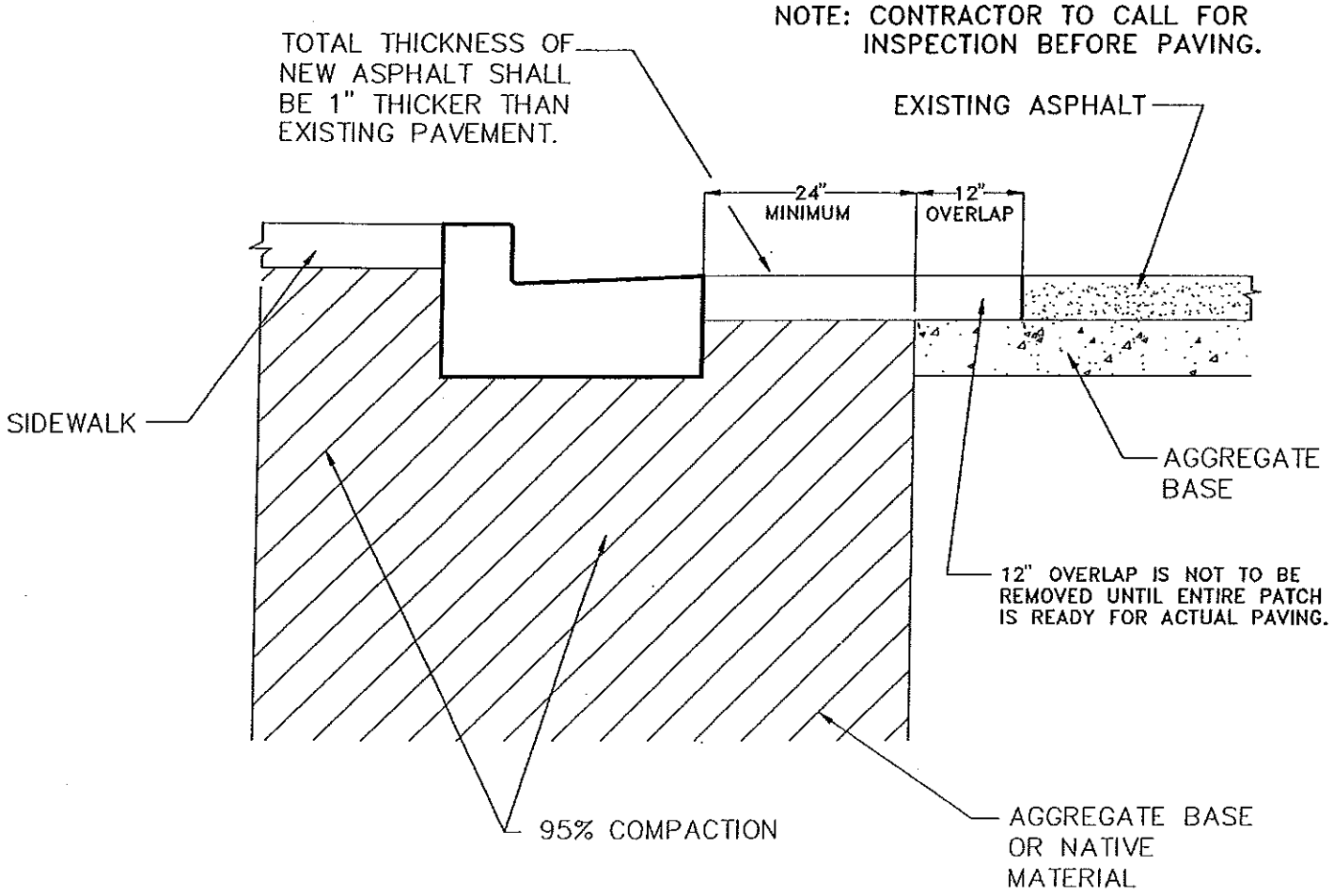
NOTE: CONTRACTOR TO CALL FOR INSPECTION BEFORE PAVING.



NOTE:

1. TACK-COAT VERTICAL EDGES PRIOR TO PLACING NEW HOT ASPHALT.
2. TACK COAT SHALL BE SS1H (1to1).
3. ASPHALT SHALL BE D 1/2 PER M.A.G. SPECIFICATIONS.
4. ANY TRENCHING PERMITTED IN AN ASPHALT PAVED STREET BY THE CITY ENGINEER SHALL BE TESTED FOR COMPACTION BY CONTRACTOR AND THE RESULTS OF OF THE TEST SHALL BE SUBMITTED TO THE CITY ENGINEER FOR REVIEW OF CONFORMANCE AS PER M.A.G. SPECIFICATIONS.

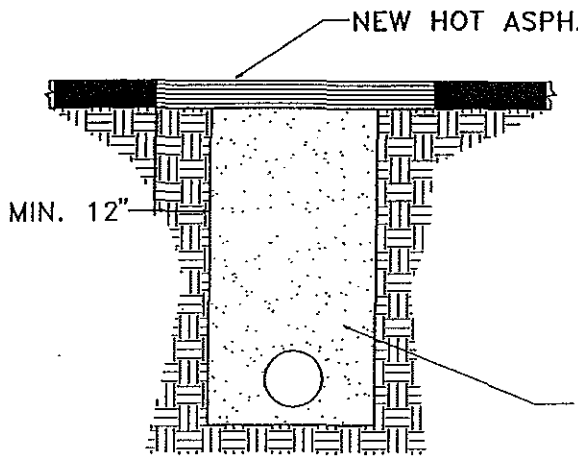
'OPTED BY CITY 'CIL RESOLUTION		CITY OF BULLHEAD CITY	DATE 12/97
98R-056	REVISED ORDINANCE NO. 97-852 5/15/97 REVISION DATE	*STANDARD DETAIL* TRENCH DETAIL FOR STREETS LESS THAN 2 YEARS OLD	50.2



NOTE:

1. TACK-COAT VERTICAL EDGES PRIOR TO PLACING NEW HOT ASPHALT.
2. ALL TRENCH NOT IN ROAD WAY SHALL BE COMPACTED TO 90% COMPACTION TRENCH UNDER PROPOSED SIDEWALK SHALL BE 95%.
3. TACK COAT SHALL BE SS1H (1to1).
4. ASPHALT SHALL BE D 1/2 PER M.A.G. SPECIFICATIONS.
5. ANY TRENCHING PERMITTED BY THE CITY ENGINEER IN AN ASPHALT PAVED STREET SHALL BE TESTED FOR COMPACTION BY CONTRACTOR AND THE RESULTS OF OF THE TEST SHALL BE SUBMITTED TO THE CITY ENGINEER FOR REVIEW OF CONFORMANCE AS PER M.A.G. SPECIFICATIONS.
6. MARKING TAPE REQUIRED ABOVE ALL ABS OR PVC PIPE.

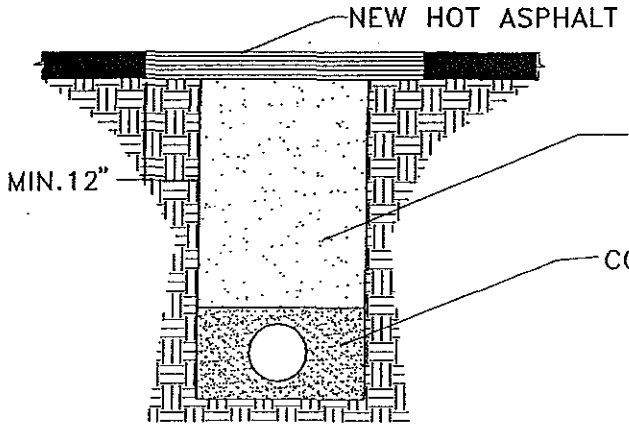
"OPTED BY CITY NCIL RESOLUTION 98R-056		CITY OF BULLHEAD CITY	DATE 12/97
	REVISED ORDINANCE NO. 97-852 5/15/97 REVISION DATE	STANDARD DETAIL CURB CUT DETAIL	50.3

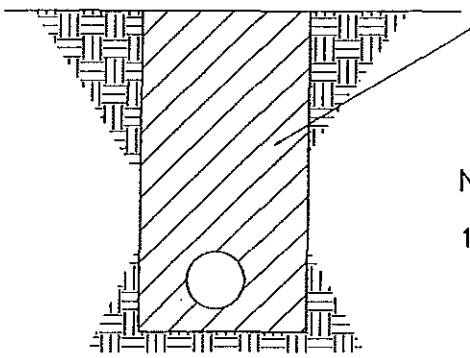


NON-SHRINK BACKFILL MIX:

2600 lbs., 3/8 MINUS AGGREGATE
800 lbs. SAND
94 lbs. CEMENT (1 SACK)
11 GALLONS WATER

NOTE: CONTRACTOR TO CALL FOR INSPECTION BEFORE PAVING.



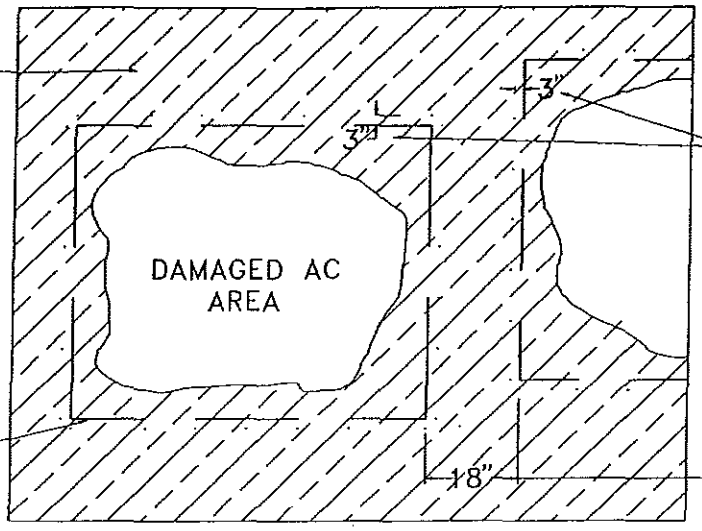


NOTES:

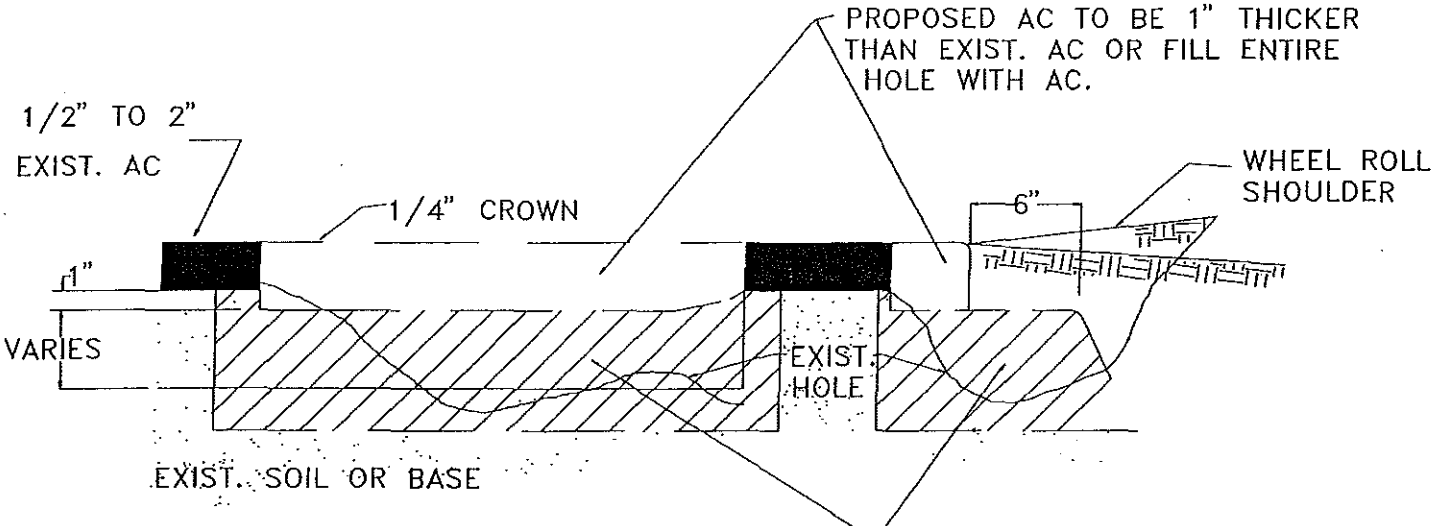
1. COLD MIX TEMP. PATCH TO BE PLACED PER BHC PROCEDURES MANUAL, HOT MIX ASPHALT FOR PERMANENT REPAIR IS TO BE PLACED PER TRENCH PAVING ORDINANCE.

2. MARKING TAPE OR WIRE REQUIRED ABOVE ALL ABS OR PVC PIPE.

OPTED BY CITY ICIL RESOLUTION 98R-056	REVISED ORDINANCE NO. 97-852 5/15/97 REVISION DATE	CITY OF BULLHEAD CITY *STANDARD DETAIL* UTILITY TRENCH DETAIL NON-SHRINK BACKFILL SLURRY	DATE 12/97 50.4



PLAN VIEW
N.T.S.



TYPICAL SECTION
N.T.S.

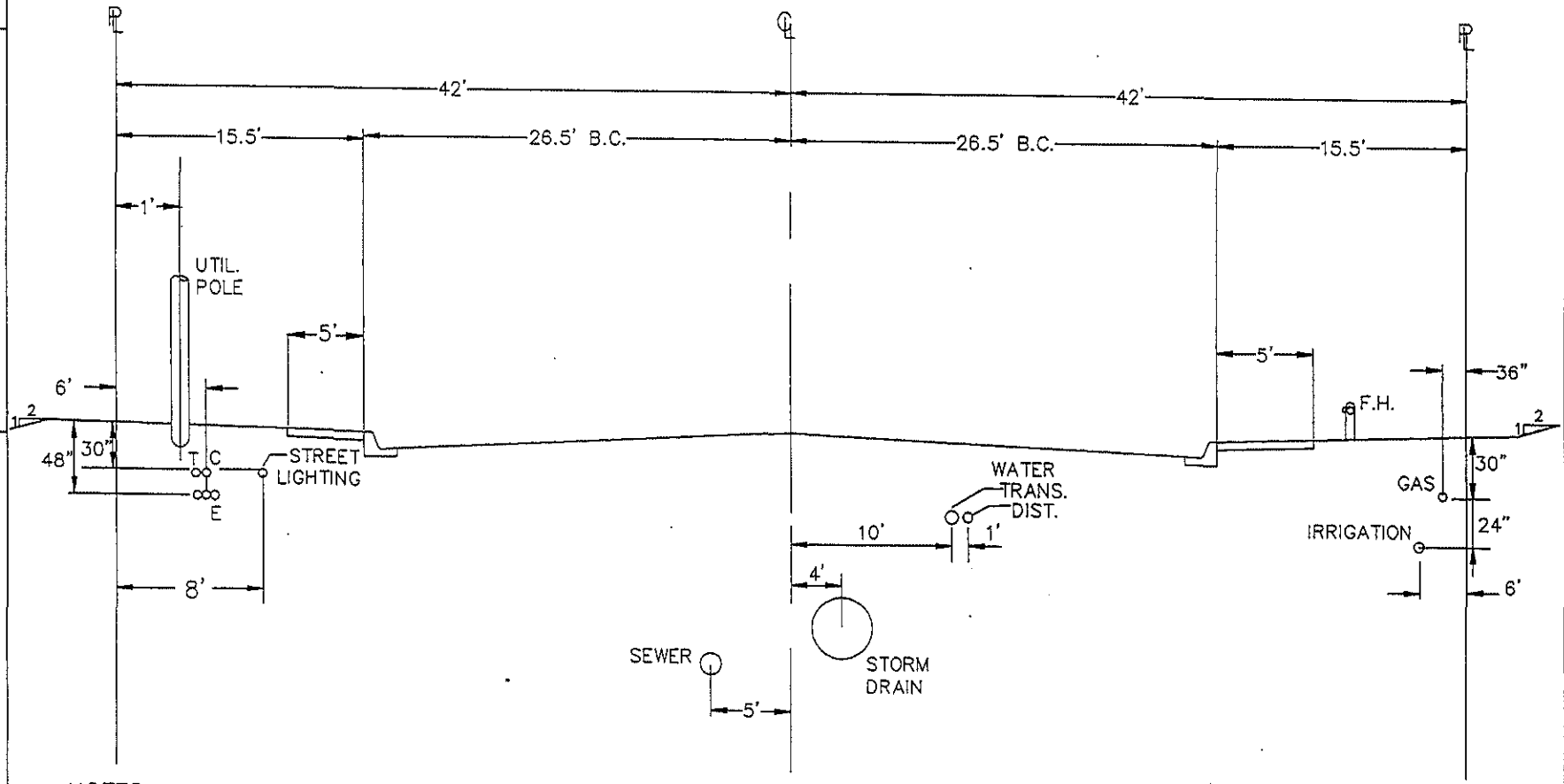
NOTES:

1. EXISTING POTHOLES SHALL BE FREE OF LOOSE SOIL DOWN TO GOOD BASE, OR 4" BELOW AC. IF HOLE IS EXTRA DEEP, CONTRACTOR MAY ADD MORE CRUSHED AGGREGATE.
2. CRUSHED AGGREGATE SHALL BE MOISTURIZED AND COMPACTED TO 95% COMPACTION.
3. CONTRACTOR TO CALL FOR INSPECTION BEFORE PAVING.

ADOPTED BY CITY COUNCIL RESOLUTION		CITY OF BULLHEAD CITY	DATE
98R-056	REVISED ORDINANCE NO. 97-852 5/15/97 REVISION DATE	STANDARD DETAIL ASPHALT CONCRETE POTHOLE PATCH DETAIL	12/97 50.5

STANDARD UTILITY LOCATION GUIDELINES

ARTERIAL STREETS – 84' R/W



NOTES:

1. LOCATIONS,AS A GROUP, MAY BE REVERSED AS A MIRRORED IMAGE.
2. SOME LINES ARE SHOWN AT DEEPER ELEVATIONS FOR CLARITY ONLY.
3. IN AREAS WITHOUT THESE UTILITIES, INSTALL 4" CONDUIT FOR FUTURE UTILTIY INSTALLATION UNDER DRIVEWAYS.
4. THE CITY'S ENGINEER REPRESENTATIVE MAY MODIFY LOCATIONS BASED ON SPECIAL CIRCUMSTANCES UPON REQUEST OF THE UTILITY COMPANY.

ADOPTED BY CITY COUNCIL RESOLUTION 98R-056

REVISION DATE

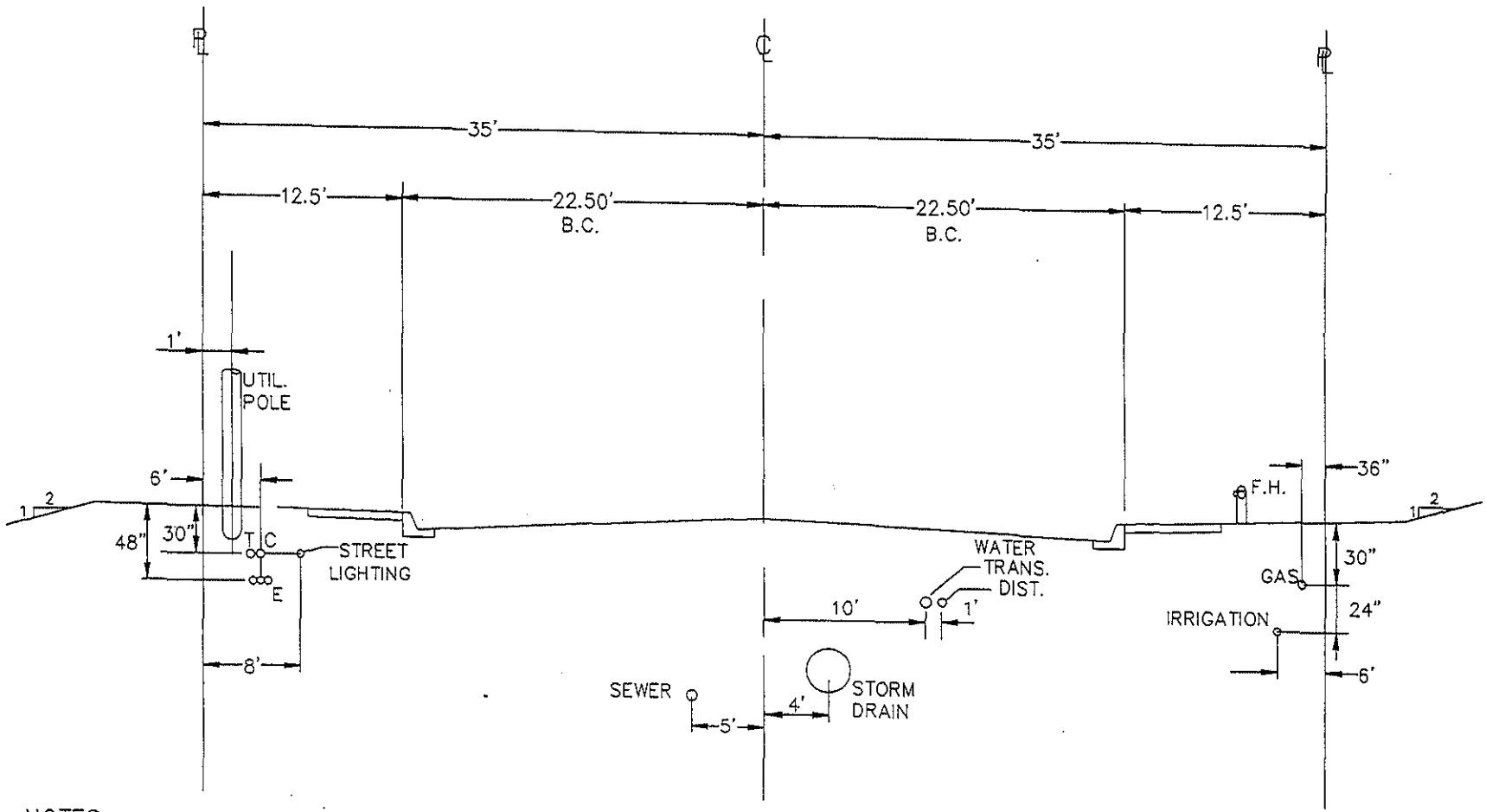
CITY OF BULLHEAD CITY

STANDARD DETAIL
UTILITY LOCATION GUIDELINES

60.1

DATE 12/97

STANDARD UTILITY LOCATION GUIDELINES
COLLECTOR STREETS – 70' R/W



NOTES:
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2. SOME LINES ARE SHOWN AT DEEPER ELEVATIONS FOR CLARITY ONLY.
3. IN AREAS WITHOUT THESE UTILITIES, INSTALL 4" CONDUIT FOR FUTURE UTILTIY INSTALLATION UNDER DRIVEWAYS.
4. THE CITY'S ENGINEER REPRESENTATIVE MAY MODIFY LOCATIONS BASED ON SPECIAL CIRCUMSTANCES UPON REQUEST OF THE UTILITY COMPANY.

ADOPTED BY CITY COUNCIL RESOLUTION
98R-056

REVISION DATE

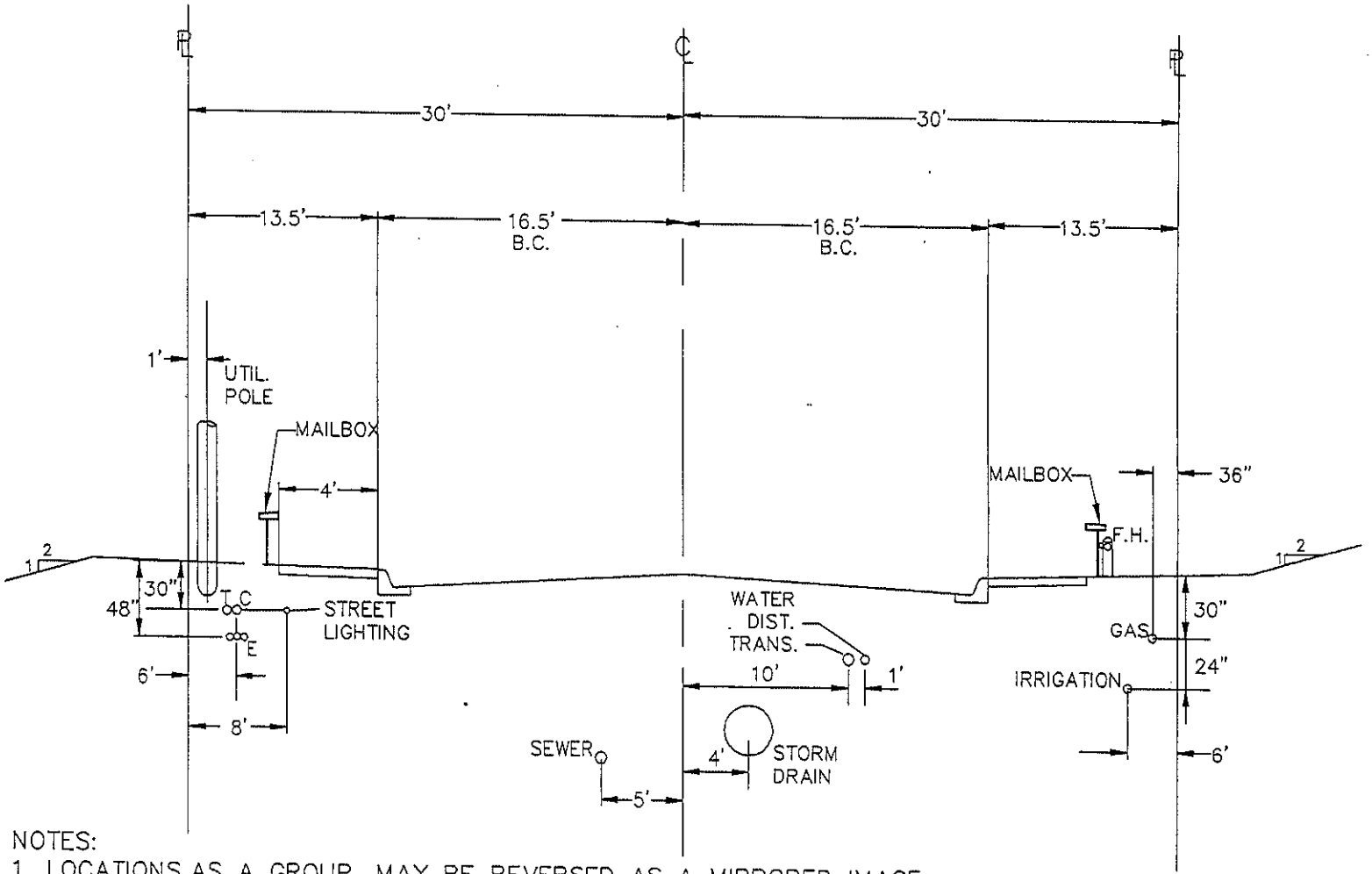
CITY OF BULLHEAD CITY

STANDARD DETAIL
UTILITY LOCATION GUIDELINES

60.2

DATE 12/97

STANDARD UTILITY LOCATION GUIDELINES
RESIDENTIAL/LOCAL, 60' R/W,



NOTES:
1. LOCATIONS,AS A GROUP, MAY BE REVERSED AS A MIRRORED IMAGE.
2. SOME LINES ARE SHOWN AT DEEPER ELEVATIONS FOR CLARITY ONLY.
3. IN AREAS WITHOUT THESE UTILITIES, INSTALL 4" CONDUIT FOR FUTURE UTILTIY INSTALLATION UNDER DRIVEWAYS.
4. THE CITY'S ENGINEER REPRESENTATIVE MAY MODIFY LOCATIONS BASED ON SPECIAL CIRCUMSTANCES UPON REQUEST OF THE UTILITY COMPANY.

ADOPTED BY CITY COUNCIL RESOLUTION
98R-056

REVISION DATE

CITY OF BULLHEAD CITY

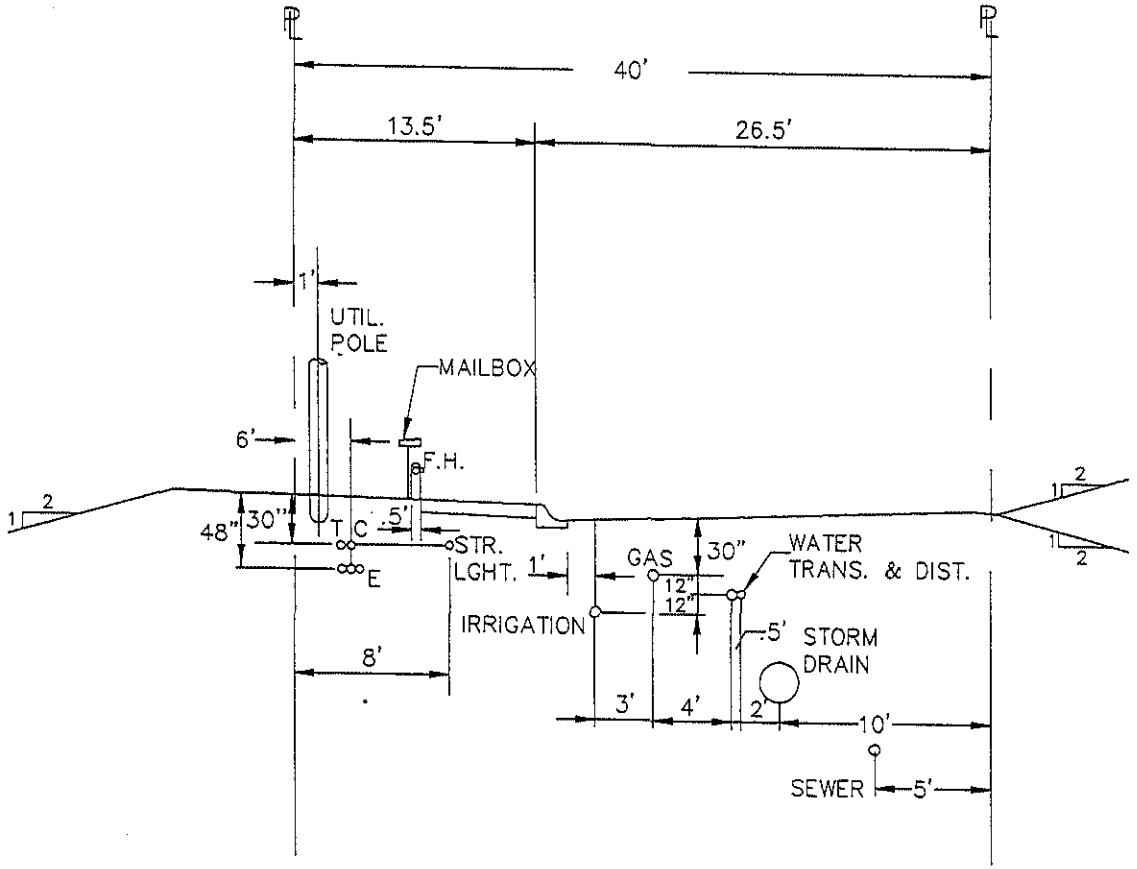
STANDARD DETAIL
UTILITY LOCATION GUIDELINES

60.3

DATE 12/97

STANDARD UTILITY LOCATION GUIDELINES

1/2 STREET



NOTES:
1. LOCATIONS,AS A GROUP, MAY BE REVERSED AS A MIRRORED IMAGE.
2. SOME LINES ARE SHOWN AT DEEPER ELEVATIONS FOR CLARITY ONLY.
3. IN AREAS WITHOUT THESE UTILITIES, INSTALL 4" CONDUIT FOR FUTURE UTILTIY INSTALLATION UNDER DRIVEWAYS.
4. THE CITY'S ENGINEER REPRESENTATIVE MAY MODIFY LOCATIONS BASED ON SPECIAL CIRCUMSTANCES UPON REQUEST OF THE UTILITY COMPANY.

ADOPTED BY CITY COUNCIL RESOLUTION 98R-056

REVISION	DATE

CITY OF BULLHEAD CITY

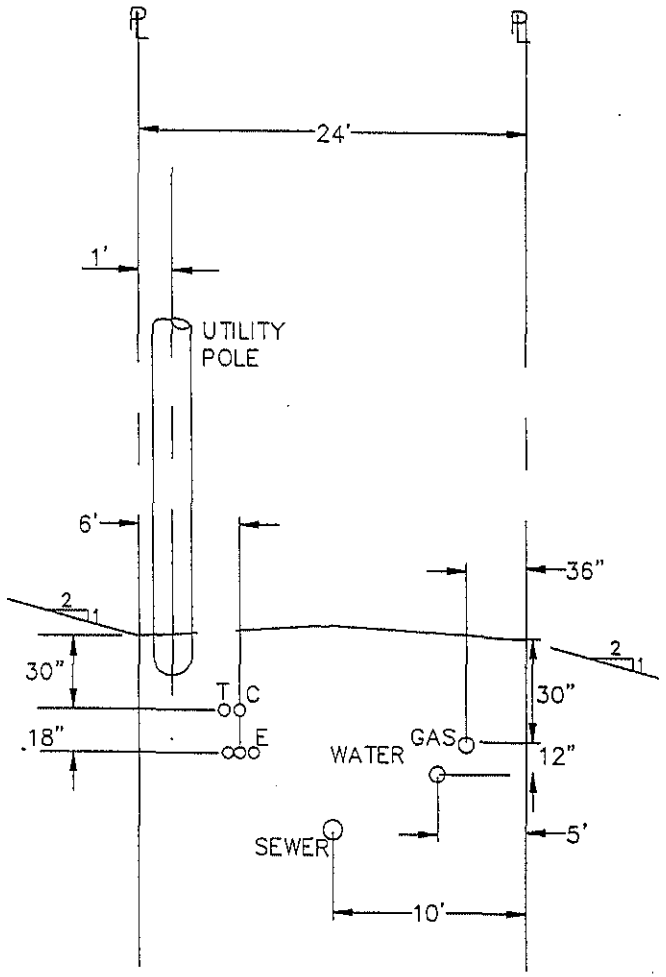
STANDARD DETAIL
UTILITY LOCATION GUIDELINES

60.4

DATE 12/97

STANDARD UTILITY LOCATION GUIDELINES

ALLEY



NOTES:

1. LOCATIONS,AS A GROUP, MAY BE REVERSED AS A MIRRORED IMAGE.
2. SOME LINES ARE SHOWN AT DEEPER ELEVATIONS FOR CLARITY ONLY.
3. IN AREAS WITHOUT THESE UTILITIES, INSTALL 4" CONDUIT FOR FUTURE UTILTIY INSTALLATION UNDER DRIVEWAYS.
4. THE CITY'S ENGINEER REPRESENTATIVE MAY MODIFY LOCATIONS BASED ON SPECIAL CIRCUMSTANCES UPON REQUEST OF THE UTILITY COMPANY.

ADOPTED BY CITY COUNCIL RESOLUTION 98R-056

REVISION DATE

CITY OF BULLHEAD CITY

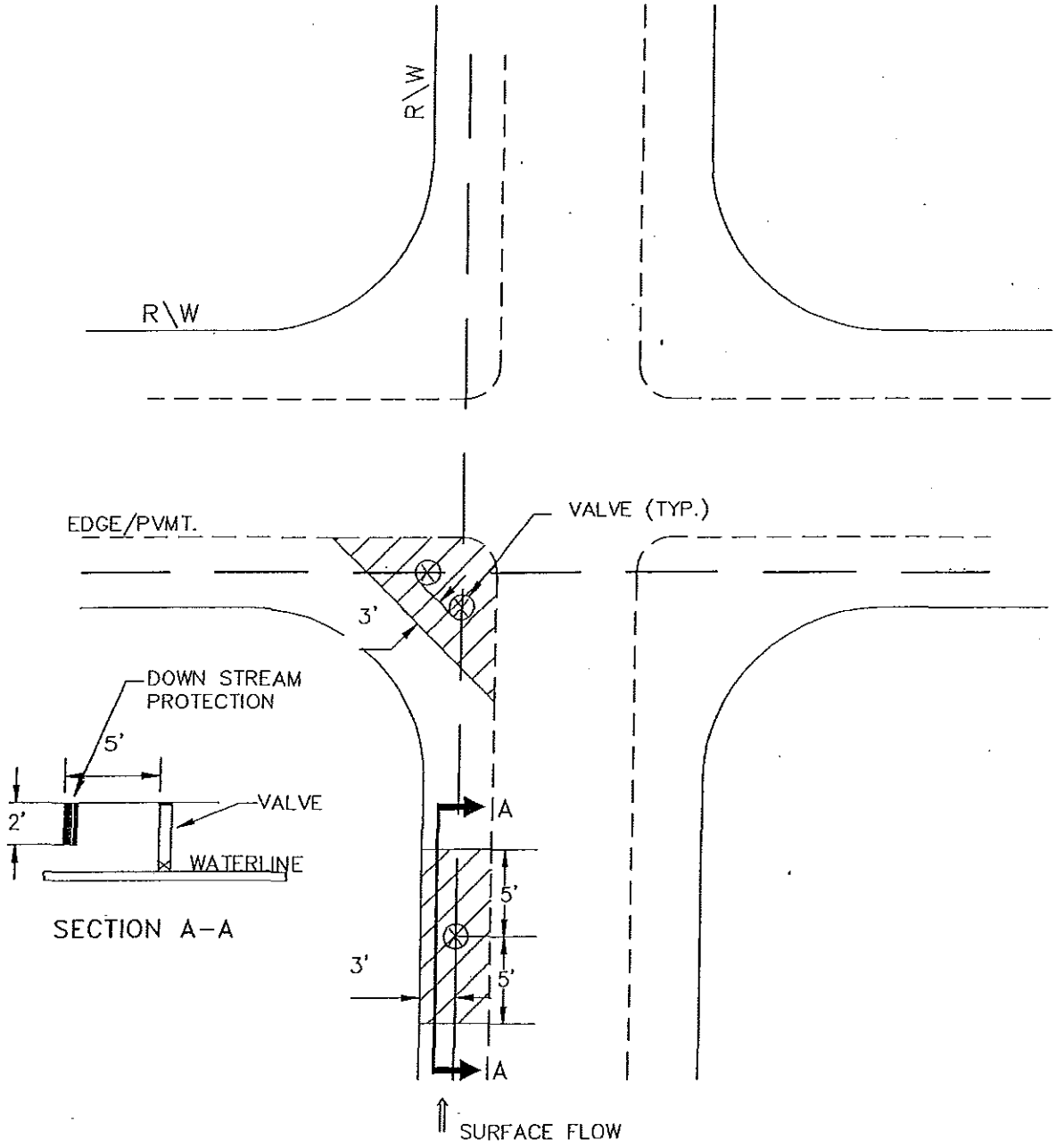
STANDARD DETAIL
UTILITY LOCATION GUIDELINES

60.5

DATE 12/97

STANDARD DETAIL

ADDITIONAL PAVING GUIDELINES FOR WATER VALVE PROTECTION



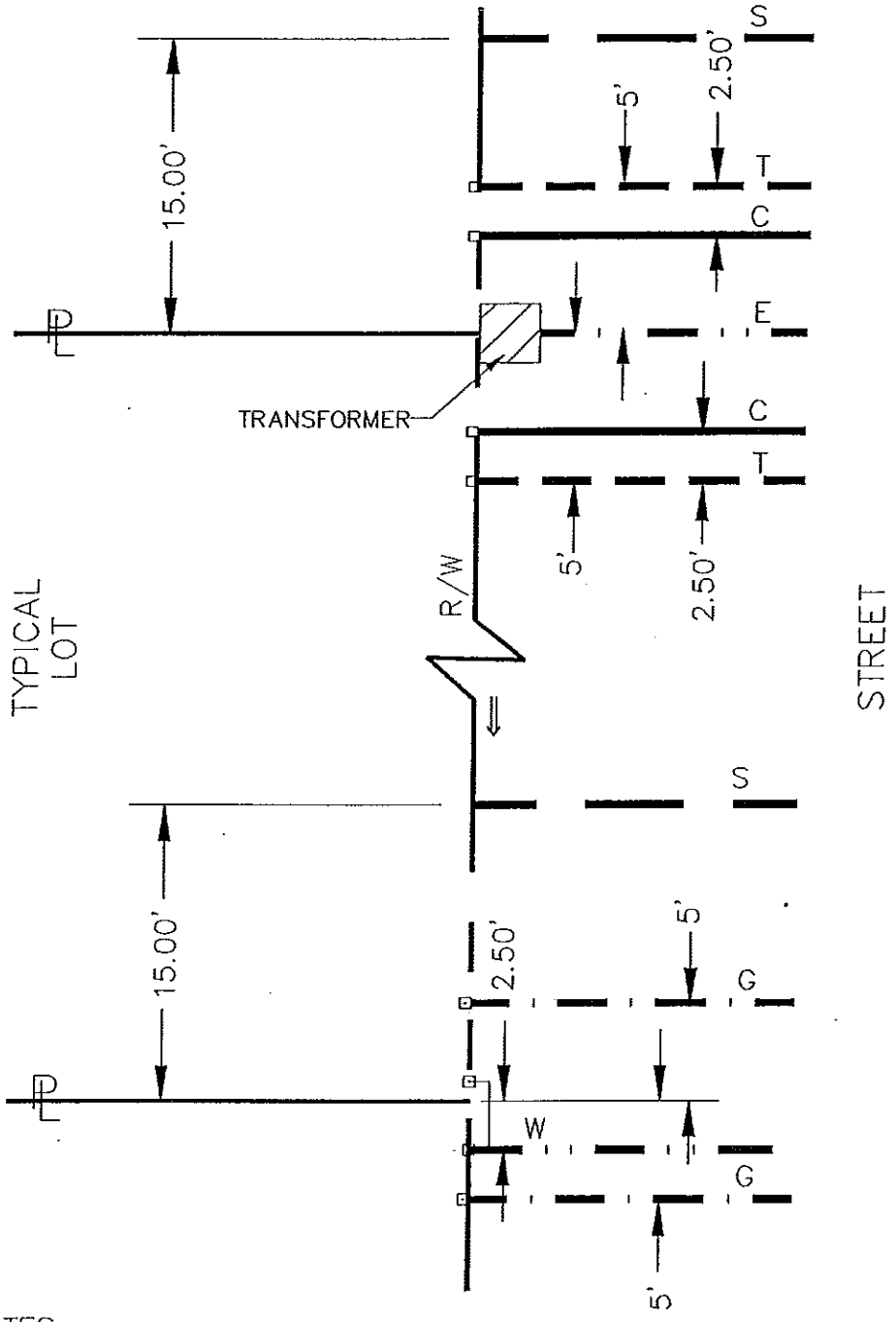
1. WHERE NO CURB IS TO BE CONSTRUCTED THE PAVING SECTION WILL BE EXTENDED THREE (3) FEET BEYOND THE VALVES (GAS,WATER) AND FIVE (5) FEET UP AND DOWN STREAM; THE DOWN STREAM SIDE WILL BE PROTECTED TO A DEPTH OF TWO (2) FEET.

ADOPTED BY CITY COUNCIL RESOLUTION		CITY OF BULLHEAD CITY	DATE 12/97
98R-056	REVISION DATE	STANDARD DETAIL UTILITY LOCATION GUIDELINES	60.6

STANDARD DETAIL

STANDARD UTILITY LOCATION

TYPICAL SERVICE LOCATIONS

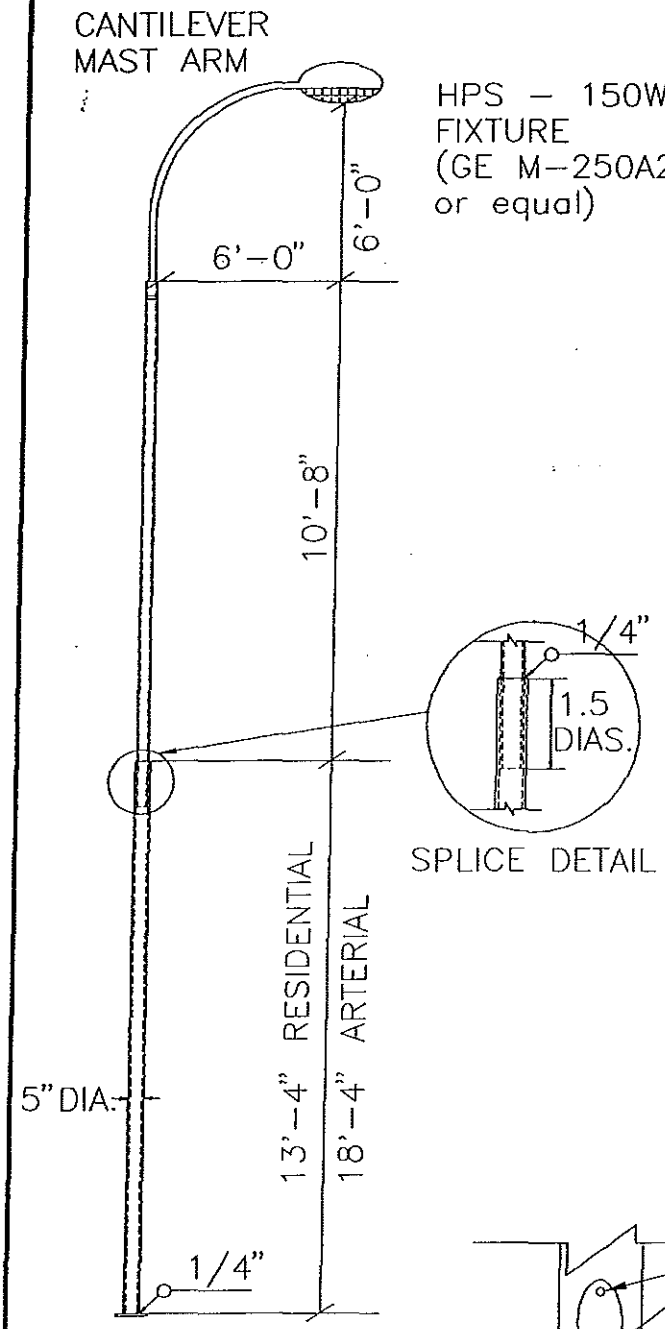


LEGEND

S – SEWER
C – CABLE TV
T – TELEPHONE
E – ELECTRIC
W – WATER
G – GAS

NOTES:
1. SEWER LATERAL TO BE LOCATED ON LOW SIDE OF LOT.
2. MINIMUM 2' OF COVER REQUIRED OVER SERVICE LINES.

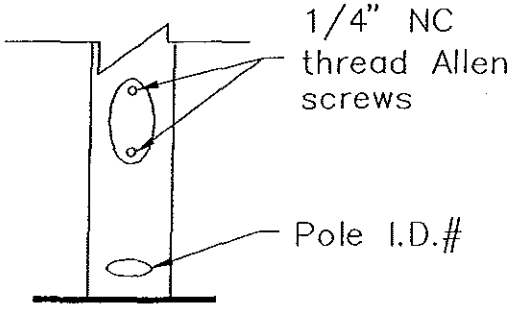
ADOPTED BY CITY COUNCIL RESOLUTION		CITY OF BULLHEAD CITY	DATE 12/97
98R-056	REVISION DATE	STANDARD DETAIL UTILITY LOCATION GUIDELINES	60.7



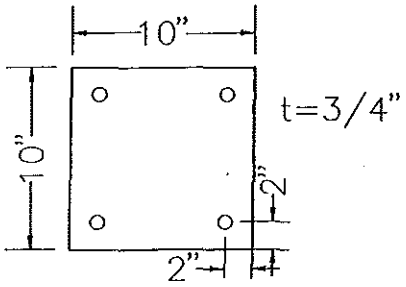
POLE DETAIL

GENERAL NOTES

1. All pipe shall conform to ASTM A–53 Steel specifications and designed to withstand 80mph winds.
2. Pole base plates shall conform to ASTM A–36 Steel spec's.
3. All welds shall be ground smooth and all burrs removed prior to painting.
4. Surfaces shall be sandblasted per SSPC spec. SP–6–63 to remove rust scale and other foreign materials prior to painting a primer coat and shall be appllied immed–iately after cleaning.
5. The primer coat shall be compatible with the finish coat and of 1 mil thickness. The finish coat shall be 2 mil thickness catalyzed Poly–urethane Enamel.



FUSE LINK LOCATION



BASE PLATE DETAIL

OPTED BY CITY CIL RESOLUTION 98R–056	REVISION DATE	CITY OF BULLHEAD CITY STANDARD DETAIL TYPICAL POLE DETAIL	DATE 12/97 70.1

ADOPTED BY CITY COUNCIL RESOLUTION 98R-056

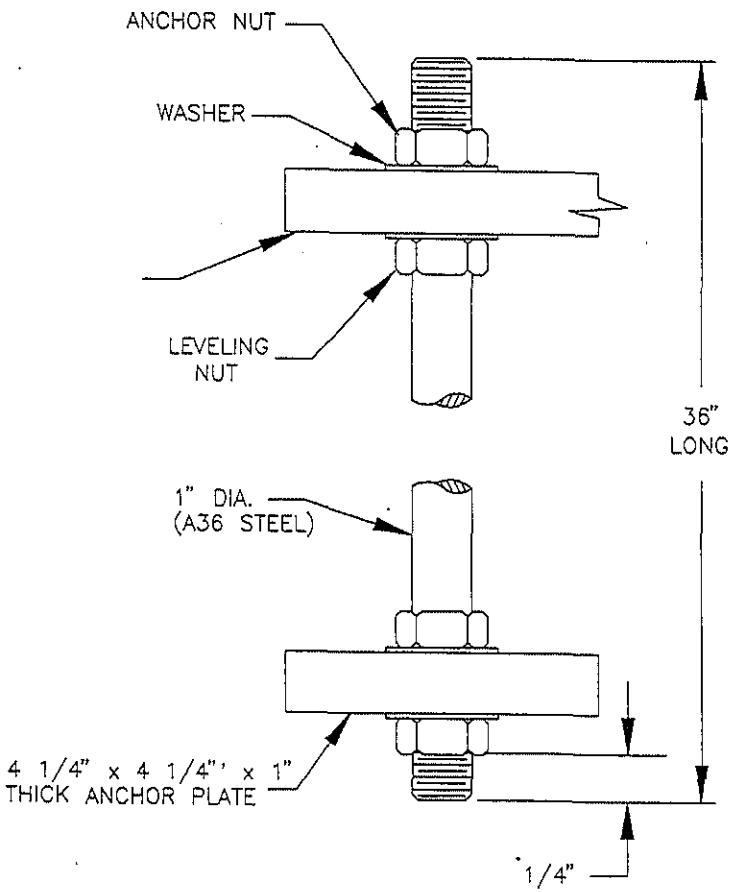
REVISION DATE

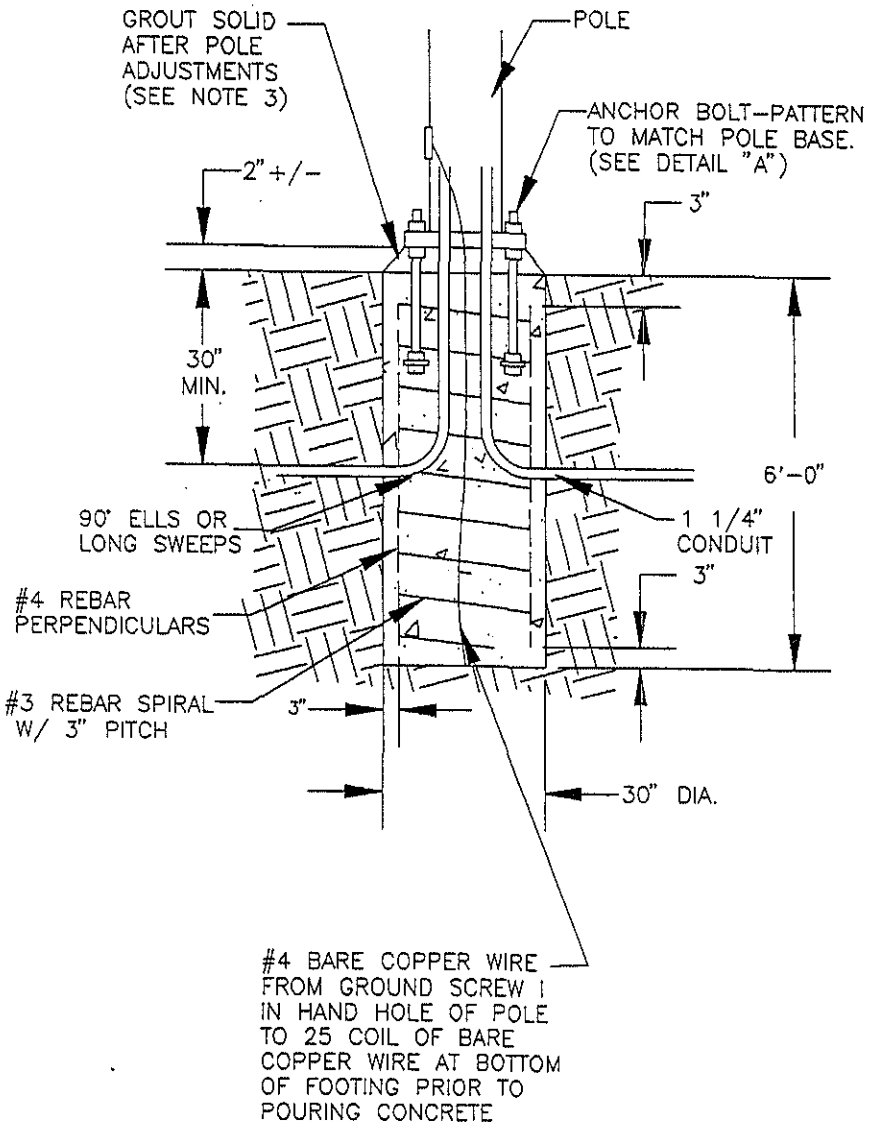
CITY OF BULLHEAD CITY

STANDARD DETAIL
STREET LIGHT POLE MOUNTING, CONDUIT RUNS & GROUNDING DETAIL

70.2

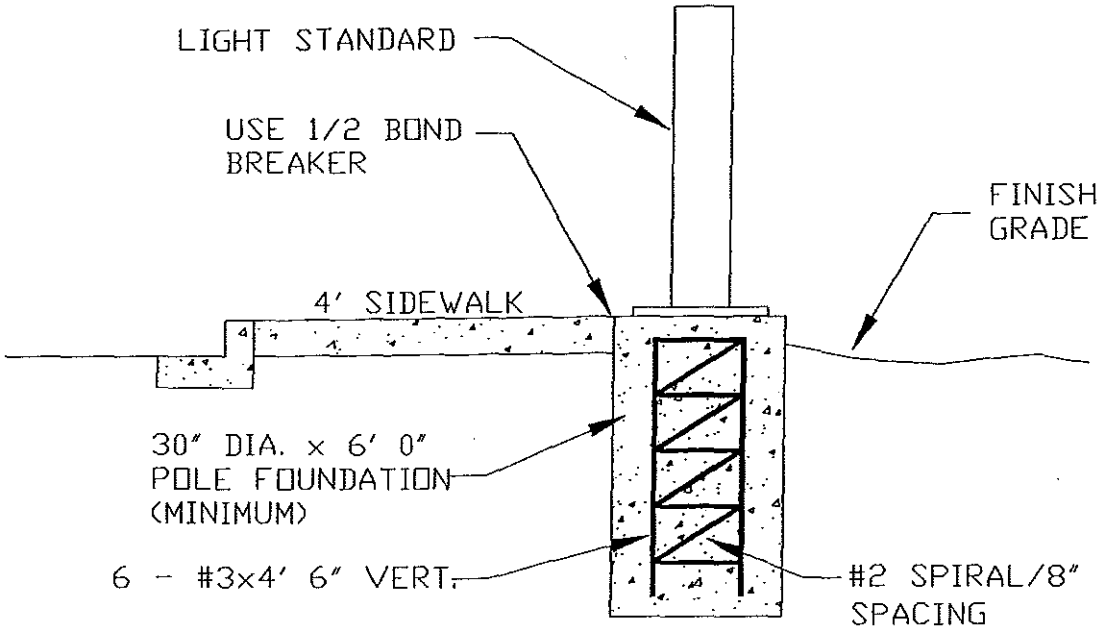
DATE 12/97



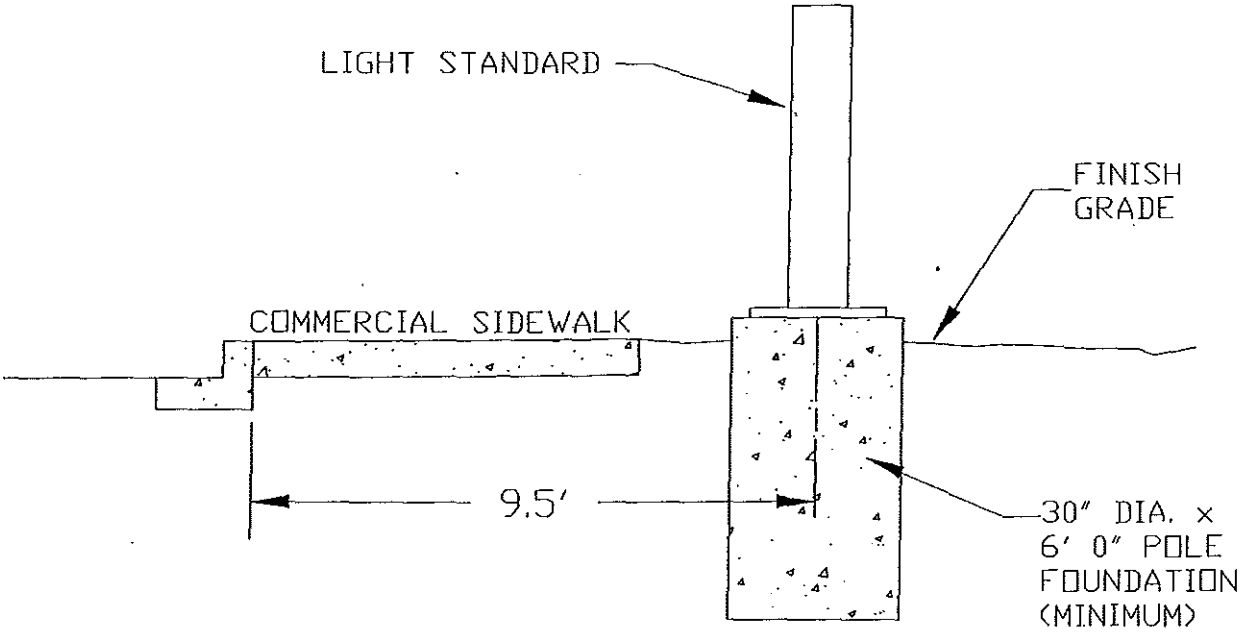


NOTES:

1. ALL BASE PLATE CONNECTING HARDWARE SHALL BE GALVANIZED & PAINTED WITH CATALYZED POLYURETHANE PAINT TO MATCH THE COLOR OF THE POLE.
2. LIGHT POLES SHALL BE PLUMBED VERTICAL RESTING ON THE FOUR LEVELING NUTS. THE POLE WILL THEN BE SECURED IN THE VERTICAL POSITION WITH ANCHOR NUTS AND WASHERS. ANCHOR NUTS WILL BE TORQUED TO 140 FT.-LBS.
3. AFTER THE LIGHT POLE HAS BEEN SECURED IN THE VERTICAL POSITION, NON-SHRINK LEVELING GROUT WILL BE USED TO FILL THE SPACE BETWEEN THE POLE BASE PLATE AND THE CONCRETE BASE. THE EDGES OF THE GROUT FILLER WILL BE CHAMFERED AT 45° TO THE BOTTOM EDGE OF THE BASE PLATE. (MINIMUM STRENGTH IN 28 DAYS = 2500 PSI.)



RESIDENTIAL



ARTERIAL

ADOPTED BY CITY COUNCIL RESOLUTION		CITY OF BULLHEAD CITY	DATE 12/97
98R-056	REVISION DATE	STANDARD DETAIL STREET LIGHT FOUNDATION DETAIL	70.3