



Technical Memorandum

To: *City of Rosemount Engineering Guidelines Distribution Recipients*

From: *Bill Alms, WSB & Associates*

Date: *May 19, 2016*

Re: *Use of Atlas 14 Precipitation data within the City of Rosemount, MN*

Implementation

This technical memorandum is a supplement to the City of Rosemount Engineer Guidelines dated February 2008. This memorandum is effective immediately for all developers, builders, and engineers creating final plans and specifications within the City of Rosemount.

Guidelines

Use Atlas 14 Precipitation Frequency Estimates when using rainfall-runoff models to compute hydrology for the design of hydraulic infrastructure. The Atlas 14 data is obtained from NOAA's Precipitation Frequency Data Server (PFDS): <http://hdsc.nws.noaa.gov/hdsc/pfds/>

Rational Method

Use the precipitation intensities from Atlas 14 for the project location to develop a project Intensity-Duration-Frequency (IDF) curve, or use the Atlas 14 regionalized IDF values developed by MnDOT with the Rational Method to calculate flow.

<http://www.dot.state.mn.us/bridge/hydraulics/atlas14/atlas14regions/atlas14regions.html>

NRCS Method

Use the rainfall distribution derived from Atlas 14 data or use the NRCS MSE 3 rainfall distribution with the NRCS rainfall/runoff hydrology method. Do not use the NRCS Type II rainfall distribution. Use the Atlas 14 depth for the project location or the Minnesota NRCS Atlas 14 county average depth when the 24 hour precipitation depth is used. Use the standard NRCS dimensionless unit hydrograph with the peak rate factor of 484.

Further guidance on the NRCS methodology is available from the Minnesota NRCS Office at:

http://www.nrcs.usda.gov/wps/portal/nrcs/detail/mn/technical/?cid=nrcs142p2_023722

Questions

Any questions regarding the technical provisions of this Technical Memorandum can be address to the following:

- **Bill Alms, City of Rosemount Water Resources Consultant at walms@wsbeng.com or 763-231-4845.**

City of Rosemount
Engineering Guidelines

February 2008

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FORWARD

The following Engineering Guidelines have been prepared to assist developers, builders and engineers performing land development improvements and infrastructure installation within the City of Rosemount. This manual serves as a reference for engineering guidelines that must be incorporated into the design, plan and specification preparation, construction, and/or connection to public infrastructure facilities within the City of Rosemount.

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PROLOGUE

This information has been prepared to assist developers, builders, and engineers in the development of final plans and specifications in the City of Rosemount. It is not intended to be, nor should it be used as a specification for any improvement, but rather a guideline to be used in the preparation of such documents.

Design and construction work shall conform to the most recent editions of the following:

- Mn/DOT Standard Specifications for Construction
- City Engineers Association of Minnesota Standard Utilities Specifications
- Protecting Water Quality in Urban Areas (Best Management Practices for Minnesota)
- Recommended Standards for Water Works (Ten States' Standards)
- Recommended Standards for Wastewater Facilities (Ten States' Standards)
- National Urban Runoff Program (NURP)
- Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways
- Mn/DOT Road Design Manual

or as modified herein and the most recent City of Rosemount Standard Detail Plates, general specifications and comprehensive plans.

All designs must incorporate the requirements identified in the City's Comprehensive Plans in effect at the time of the infrastructure design and installation.

A copy of City of Rosemount General Specifications with Standard Detail Plates, and the comprehensive plans are on file for review at the City Hall or may be purchased in accordance with the most recent fee schedule.

Prior to beginning construction, all regulatory agency permits and approvals shall be obtained including the following, but not limited to:

- Army Corp of Engineers
- City of Rosemount
- Dakota County
- Metropolitan Council (Environmental Services)
- Minnesota Department of Health
- Minnesota Department of Natural Resources
- Minnesota Department of Transportation
- Minnesota Pollution Control Agency

DESIGN STANDARDS

I. GRADING, DRAINAGE AND EROSION CONTROL

The grading plans and erosion control systems shall conform to the most recent editions of **Protecting Water Quality in Urban Areas** (Best Management Practices for Minnesota), **National Urban Runoff Program** (NURP), City of Rosemount **Surface Water Management Plan** (or as modified herein) and the City's most recent **Specification Book** and comprehensive plans. These comprehensive plans contain information that the design professional must incorporate in the design of a public infrastructure within the City.

The following are specific requirements related to the development of grading/erosion control plans for the proposed subdivision and adjacent land within 200' unless noted otherwise:

1. General:

- a. Grading/erosion control plans designed and signed by a civil engineer or a land surveyor registered in the State of Minnesota.
- b. Show all drainage and utility easements.
- c. Show lowest floor and lowest opening elevations.
- d. Show existing and proposed building and driveway footprints. For driveway footprints display proposed driveway grade and maximum proposed driveway grade.
- e. Show lot corner elevations and bench marks utilized.
- f. Show or define access routes for maintenance purposes to all inlets, outlets, manholes and lift stations at ponding areas.
- g. Show existing underground and overhead utilities.
- h. Show location and indication of demolition or relocation of existing structures.
- i. Show existing and abandoned drain fields, alternate drain fields and wells.
- j. Show proposed drain fields, alternate drain fields and wells.
- k. Show removal of all trees and brush below the controlled water level that will be impacted from existing and newly created ponding areas. The developer is responsible for the removal of all significant vegetation (trees, stumps, brush, debris, etc.) from any and all areas which would be inundated by the designated controlled water elevation (NWL), and the removal of dead vegetation to the HWL of the pond.

2. Ponds and Wetlands:

- a. Show the Surface Water Management Plan pond number, NWL, HWL and storage volume for ponds.
- b. Show 10-year and 100-year design drainage boundaries. Show acreage of each drainage

area/watershed.

- c. Show wetland boundaries as professionally delineated according to the 1987 Corp of Engineers "Wetland Delineation Manual." Per the Wetland Conservation Act (WCA), a wetland delineation report shall be submitted to the City as the Local Government Unit (LGU) for review and concurrence.
- d. Show the City of Rosemount Comprehensive Wetland Management Plan wetland number, management category, NWL and HWL for wetlands.
- e. A protective buffer strip of natural vegetation shall surround all wetlands. The buffer strip width depends on the wetland management category as defined in the City's Comprehensive Wetland Management Plan.
- f. Wetland impacts must be permitted by the Local Government Unit before construction commences in accordance with the Wetland Conservation Act.
- g. If applicable, show DNR OHWL elevation and DNR pond number and U.S. Fish & Wildlife classification.
- h. Additional information can be found in the Water Quality subsection of the Storm Sewer section of this document.

3. Emergency Overflow Routes:

- a. All Emergency Overflow Routes and cross-lot drainage need to be encompassed by a drainage/utility easement.
- b. Overland emergency overflow routes shall be provided for all basins in addition to the normal pipe outlet.
- c. Show emergency overflow routes from all low points and show high point elevation along emergency overflow routes and the directional flow arrows. Show emergency overflow route typical section with bottom width and side slopes.
- d. If a pipe is installed to provide for an emergency overflow, label it as the emergency overflow.
- e. Additional information can be found in Water Quantity and Water Quality subsections of the Storm Sewer section of this document.

4. Retaining walls:

- a. Are not allowed in easements or rights-of-way.
- b. Shall be shown on grading plans where applicable to display final grading accurately.
- c. Show top and bottom of wall elevations at beginning and end of wall, at point of maximum height, and at points along the length of wall to adequately describe the retaining wall.

- d. Retaining walls exceeding 4' in height shall require a plan prepared by a licensed engineer submitted for review and approval by the Building Official prior to permit issuance.

5. Erosion control:

- a. At a minimum, observe standards established in the following reports: "Protecting Water Quality in Urban Areas" (Best Management Practices for Minnesota), "National Urban Runoff Program" (NURP) and the "Surface Water Management Plan" for the City of Rosemount or as modified herein.
- b. A separate erosion control plan is required that will accompany the grading plan. The plan shall be compliant with all City and NPDES standards. The erosion control plan will also show all proposed erosion control Best Management Practices (BMPs) including silt fences, inlet protection, construction entrances, temporary sediment basins and any other methods as required.
- c. In all new developments, sod shall be installed in the boulevard adjacent to the curb and gutter. Other appropriate sedimentation measures in the boulevards may be considered in lieu of sod but will require approval of the City Engineer.

6. Grading:

- a. Show limits of clearing and grading.
- b. Existing contours shall be at 1' or 2' intervals to a mean sea level datum (dashed lines). The contours shall extend beyond the proposed plat boundaries 200' or more to completely show the limits of a drainage basin(s) not fully contained within the proposed plat.
- c. Proposed contours shall be at 1' or 2' intervals to a mean sea level datum (solid lines).
- d. Maximum slopes of 4:1 (Horizontal:Vertical) and minimum slopes of 2% are allowed. Maximum slopes of 3:1 (Horizontal:Vertical) are allowed below the 10:1 maintenance bench for NURP ponds.
- e. Show or define access routes for maintenance purposes to all manholes, lift stations, inlets, and/or outlets at ponding areas that are outside of public right of way. Access routes shall be paved with an 8% maximum grade, 2% cross slope, a minimum width of 10' and a turnaround where applicable. Access easements shall be dedicated at the time of final platting if necessary.

7. Submittals:

- a. Provide detailed hydrologic/hydraulic calculations verifying location and capacity adequacy of all overland drainage routes that assure all freeboard requirements are met as defined in the City of Rosemount "Surface Water Management Plan" and in the Storm Sewer section of this document.
- b. Upon the completion of the construction of a designated ponding area the developer and/or engineer is required to submit an As-Built Grading Plan of the ponding area. The record drawing must certify the pond construction and that the pond meets all design parameters as set forth in the proposed site plan and the City of Rosemount "Surface Water Management Plan" or as modified herein. See the Plan Standards section of this document for further submittal and

formatting requirements.

- c. Upon completion of grading, the developer is required to provide the City with an Individual Lot Final Grade record as-built drawing certifying grades, structure pad and lowest floor elevation of structures existing or proposed. See the Plan Standards section of this document for further submittal and formatting requirements.

8. Specifications:

- a. See the current City of Rosemount General Specifications and Standard Detail Plates for further construction requirements and for additional information.

II. STORM SEWER

Drainage facilities shall conform to the most recent editions of **City Engineers Association of Minnesota Standard Utilities Specifications, Protecting Water Quality in Urban Areas** (Best Management Practices for Minnesota), **National Urban Runoff Program** (NURP), City of Rosemount **Surface Water Management Plan** (or as modified herein) and the City's most recent **Specification Book** and comprehensive plans. These comprehensive plans contain information that the design professional must incorporate in the design of a public infrastructure within the City.

The following are specific requirements related to the construction of storm sewer facilities:

1. General Storm Sewer Design:

- a. All lateral storm sewer facilities on streets shall be designed to accommodate a 10-year rainfall event and all trunk storm sewer facilities shall be designed to handle a 100-year rainfall event as determined by the City Engineer. Low points on streets shall be designed with an acceptable emergency overflow with proper transfer capacity.
- b. Minimum lateral pipe size shall be 15" diameter, unless approved by the City Engineer.
- c. Long radius bends may be used for greater than 24" pipe diameter if necessary and approved by the City Engineer, in vertical or horizontal alignment.
- d. Refer to the current version of the *Standard Manhole for Storm Drain Detail* in the City's General Specification for the types of castings to be used on the storm sewer structures.
- e. Inlets are generally required every 300' on streets or a combination of streets and swales (250' on collector and arterial streets). The inlets shall be located to prevent runoff from flowing through intersections. Inlets should be located such that 3 cfs is the maximum flow at the inlet for the 10-year design storm event and does not exceed the applicable spread design for the road.
- f. Catch basins in the street should be in line with adjoining property lines. Catch basins in the street cannot be placed in front of driveways unless approved by the City Engineer.
- g. Catch basins shall be located on the tangent section of the curb at a point 2.5' from the intersection radius endpoint as shown on the current version of the *Street Radius for Concrete Curb and Gutter Detail* in the City's General Specifications. Mid-radius catch basins will not be allowed. Also, catch basins shall be designed to collect drainage on the upstream side of the intersection.
- h. Catch basins in unpaved areas are not allowed unless approved by the City Engineer.
- i. Any connections to existing manholes or catch basins shall be core drilled or the opening cut out with a concrete saw. No jack hammering or breaking the structure with a sledge hammer or mallet is permitted. Also, all connections to an existing system will require a manhole for access.
- j. Drain tile connections to catch basins or manholes must be approved by the City Engineer.

- k. Junction manholes should be designed to limit the hydraulic head increase by matching flow lines and by providing good angles of connection, typically greater than 90°.
- l. The maximum spacing between manholes is 500' for sewer lines 18" to 30" in diameter. Maximum spacing on large diameter sewer lines shall be approved by the City Engineer.
- m. To the greatest extent possible, manholes shall be placed in paved surfaces or other readily accessible areas.
- n. Storm sewer inlets, outlets and manholes in unpaved areas shall be marked per the current version of the *Structure Marker Sign Detail* in the City's General Specifications.
- o. Pond inlet flared end sections shall be installed with ½ the pipe diameter below the NWL elevation unless directed otherwise by the City Engineer.
- p. Use a minimum Class III riprap gradation according to the current version of *Riprap Details* in the City's General Specifications and Standard Detail Plates. Filter material as approved by the City Engineer shall be used with riprap installations. When installed at an pipe outlet on a slope, the length of riprap installation shall be the full length of the slope to the bottom of the pond.
- q. Steel sheet pile and concrete grouted riprap shall be installed at all pipe outlets 21" in diameter or larger per the current version of the *FES Sheet Piling* and *Grouted Riprap At Outlets* details in the City's General Specifications and Standard Detail Plates.
- r. Alternative methods of slope erosion protection, such as articulated open-cell blocks, may be required to control erosion of granular soils in areas of high velocity flows. This requirement shall be site specific and at the discretion of the City Engineer.
- s. Aprons or flared end sections shall be placed at all locations where the storm sewer outlets into a ponding area. All aprons or flared end sections shall be tied to the last three (3) pipe joints. The City standard for aprons or flared end sections is the latest revision of *Mn/DOT Standard Plate for Concrete Apron for Reinforced Concrete Pipe*. The use of safety aprons and safety grates shall be used based on roadway clear zone requirements.
- t. Show or define access routes for maintenance purposes to all manholes, lift stations, inlets, and/or outlets at ponding areas that are outside of public right-of-way and that meet the specific requirements related to the development of grading plans found elsewhere in this document. Access easements shall be dedicated at the time of final platting if necessary.
- u. All newly constructed and reconstructed buildings will route drain leaders to pervious areas wherein the runoff can be allowed to infiltrate. The flow rate of water exiting the leaders shall be controlled so no erosion occurs in the pervious areas.

2. Water Quantity

- a. For newly developing areas, no discharge or infiltration can be assumed for purposes of establishing the 100-year, 24-hour storm event high water elevation. For events with longer duration, a maximum peak stormwater discharge rate will be limited to 0.05 cfs/acre.
- b. In the event that the City will not be providing a regional system, storage of the runoff from the 100 year, 24 hour storm event is required on-site.
- c. The City prefers to provide rate control through the use of regional storm water retention systems versus site-by-site retention systems if regional systems are available.
- d. Drainage calculations must be submitted to demonstrate adequate rate control, storage, and infiltration are provided as per the requirements of the Comprehensive Stormwater Management Plan.
- e. New storm sewer system laterals shall be designed to accommodate discharge rates from a 10-year storm event.
- f. Storm events or runoff events shall be defined as outlined below:

The 2-year storm event is defined as 2.8" of rainfall in 24 hours.

The 10-year storm event is defined 4.2" of rainfall over 24 hours.

The 100-year storm event is defined as 6.0" of rainfall over 24 hours.

The 10-day snowmelt is defined as 7.1" of runoff.

- g. Development will be required to provide 1/12 of an acre-foot/acre/day of infiltration for the entire site's acreage. Pretreatment of stormwater is required prior to discharge to an infiltration basin. Options available for infiltration design are included in the Surface Water Management Plan.
- h. Infiltration rates of soils for design purposes are as follows:

Hydrologic soil group A : 0.30 in/hour

Hydrologic soil group B : 0.15 in/hour

Hydrologic soil group C : 0.07 in/hour

Hydrologic soil group D : 0.03 in/hour

Different infiltration rates will be considered (up to a maximum of 3.0 in/hour) by the City Engineer on a site-by-site basis based on percolation tests or other pertinent information conducted by a professional soil scientist or Professional Engineer.

- i. The City prohibits activities within the 100 year floodplain unless compensatory floodplain mitigation is provided at a 1:1 ratio by volume and it is demonstrated that the 100 year flood plain will not be impacted. In addition, no filling within the designated floodway of a drainage channel shall be allowed. Suitable calculations must be submitted and approved demonstrating that filling in the flood fringe will not impact the 100 year flood profile.

- j. The City shall restrict or prohibit uses within the floodplain that are dangerous to health, safety, or property in times of flood or which cause increase in flood elevations or velocities.
- k. The City requires that for any new or redevelopment, at least 3 feet of freeboard between the anticipated high water elevation and the minimum building opening be maintained. If this 3 foot freeboard requirement is considered a hardship, standard could be lowered to 2 feet if approved by the City Engineer and the following can be demonstrated:
 - i. That within the 2 foot freeboard area, stormwater storage is available which is equal to or exceeds 50% of the stormwater storage currently available in the basin below the 100-year high water elevation.
 - ii. That a 25% obstruction of the basin outlet over a 24-hour period would not result in more than 1 foot of additional bounce in the basin.
 - iii. An adequate overflow route from the basin is available that will provide assurance that 1 foot of freeboard will be maintained for the proposed low building opening.
- l. The City requires that minimum basement floor elevations be set to an elevation that meets the following criteria:
 - i. The basement floor elevation will be 4 feet above the currently observed groundwater elevations in the area (FHA policy).
 - ii. The basement floor elevation will be 2 feet above the elevation of any known historic high groundwater elevations for the area. Information on historic high groundwater elevations can be derived from any reasonable sources including piezometer data, soil boring data, percolation testing, etc.
 - iii. The basement floor elevation will be 1 foot above the 100-year high water elevation for the area unless it can be demonstrated that this standard creates a hardship. If a hardship is demonstrated, this requirement could be waived if a registered geotechnical engineer documents that the basement floor will be one foot above the highest anticipated groundwater elevation that could result from high surface water elevations raising the groundwater in the area during a 100-year critical duration rainfall event. The impact of high surface water elevations on groundwater elevations in the vicinity of the structure can take into consideration the site's distance from the floodplain area, the soils, the normal water elevation of surface depressions in the areas, the static groundwater table and historic water elevations in the area.

3. Water Quality

- a. In the design and construction of new, or modifications to the existing storm water conveyance systems, pretreatment of storm water runoff to Nationwide Urban Runoff Program (NURP) recommendations must be provided prior to discharge to wetlands and water bodies classified as Preserve and Manage I as outlined in the City's Wetland Management Plan and infiltration basins. The NURP design guidelines for the City are as follows:

- i. A permanent pool (“dead storage”) volume below the principal spillway (normal outlet), which shall be greater than or equal to the runoff from a 2.5 inch storm over the entire contributing drainage area assuming full development.
 - ii. A permanent pool average depth (basin volume/basin area), which shall be >4 feet, with a maximum depth of <10 feet.
 - iii. An emergency overflow (emergency outlet) adequate to control the one percent frequency/critical duration rainfall event.
 - iv. Basin side slopes above the normal water level should be no steeper than 4:1, and preferably flatter. A basin shelf with a minimum width of 10 feet and one foot deep below the normal water level is recommended to enhance wildlife habitat, reduce potential safety hazards, and improve access for long-term maintenance.
 - v. To prevent short-circuiting, the distance between major inlets and the normal outlet shall be maximized.
 - vi. A flood pool (“live storage”) volume above the principal spillway shall be adequate so that the peak discharge rates from 99%, 10%, and 1% chance critical duration storms are no greater than pre-development basin watershed conditions. Additional discharge restrictions may be required as outlined in the Stormwater Management Plan.
 - vii. Retardance of peak discharges for the more frequent storms can be achieved through a principal spillway design, which may include a perforated vertical riser, small orifice retention outlet, or compound weir. Additional discharge restrictions may be required as outlined in the Stormwater Management Plan.
 - viii. A protective buffer strip of vegetation surrounding the permanent pool at a minimum width of 15 feet.
- b. Sediment and nutrient pretreatment shall be provided to the extent necessary as outlined in the City’s Wetland Management Plan.
 - c. New developments will be required to provide mitigative measures if the development results in an increase in the phosphorus concentration of downstream water bodies that are classified as Preserve or Manage I as outlined in the City’s Wetland Management Plan. Appropriate documentation must be submitted to the City that indicates the pre- and post development phosphorus concentrations of Preserve or Management I water bodies.
 - d. Two foot sump catch basin inlets are required for all new or redevelopment within a street. A 3 foot sump catch basin or manhole is required within the street just prior to discharge to a wetland, lake, or stream.
 - e. Development plans must be in conformance with the shoreland management ordinance.
 - f. The City will require skimmers in the construction of new pond outlets, and add skimmers to the existing system whenever feasible and practical. Skimmer design shall provide for skimmers that extend a minimum of 6 inches below the water surface and minimize the velocities of water

passing under the skimmer to less than 0.5 feet per second for 1-year rainfall events. The skimmer design shall be consistent with the current City detail.

4. Wetlands

- a. Prior to issuance of any city grading or building permits, all development and redevelopment activities must comply with the Wetland Conservation Act and Wetland Management Plan. A copy of the Wetland Conservation Act Rules and the Wetland Management Plan can be obtained at City Hall.
- b. For new development, buffers around wetlands as outlined in the Wetland Management Plan will be required. These buffers include:

Preserve Wetlands: 75 Ft.
Manage I Wetlands: 50 Ft.
Manage II Wetlands: 30 Ft.
Utilize Wetland: 15 Ft. in non-agricultural areas only.

Developers shall be responsible for the installation of monuments marking the outer edge of the buffer.

5. Erosion Control

- a. The City will require erosion and sediment control on all construction sites to be in conformance with City ordinance and the Minnesota Pollution Control Agency's Best Management Practices.

6. Easements

- a. If a developer's proposal involves directing some or all runoff off -site, it shall be the responsibility of the applicant to obtain from adjacent property owners any necessary easements or other property interests concerning flowage of water.
- b. Easements are required for all landlocked ponding areas to the greater of the basins 100 year – 10 day run-off HWL elevation or back to back 100 year – 24 hour HWL elevation. Easements are required for all outletted basins, swales, ditches, and overflow routes to the basin's 100 year storm HWL elevation. Easements are required over the ultimate overflow route from land locked basins and future trunk storm sewer convergence routes.
- c. If the storm sewer is to be less than 10' deep within private property, the easement shall be a minimum of 20' wide. If the storm sewer is 10' deep or greater, then the easement shall be twice as wide as the depth.

7. Submittals

- a. Calculations and drainage area maps showing 10 year and 100 year flood boundaries shall be submitted with the plans and specifications verifying the adequacy of the number of catch basins, pipe capacities and pond sizes.
- b. A storm water pollution control plan is required for any project that requires a building permit, subdivision approval, or grading permit per the City's Surface Water Management ordinance.

- c. Upon completion of the storm sewer utility work, the developer is required to provide the City with a Utility Record Drawing. See the Plan Standards section of this document for further submittal and formatting requirements.

8. Specifications:

- a. See the current City of Rosemount General Specifications and Standard Detail Plates for further construction requirements and for additional information.

III. WATERMAIN

The design and construction of watermain and water services shall conform to the most recent editions of, "**City Engineers Association of Minnesota Standard Utilities Specifications,**" "**AWWA Standards,**" "**Recommended Standards for Water Works**" (Ten State's Standards) or as modified herein and the City's most recent Standard Detail Plates, general specifications and comprehensive plans. These comprehensive plans contain information that the design professional must incorporate in the design of a public infrastructure within the City.

The following are specific requirements related to the design of watermain and water services:

1. General

- a. All pipes and services shall be designed for a minimum of 7½' of cover to top of pipe and maximum of 10' of cover. There shall be a minimum 18" vertical clearance when crossing sanitary or storm sewer lines or services.
- b. Connections to active mains shall be wet taps.
- c. All valves shall be gate valves.
- d. Air relief valves, when required, shall have a valve prior to and after an air relief mechanism to allow replacement without shutting down main.

2. Watermain

- a. The watermain horizontal alignment shall follow the sanitary sewer alignment where practical with a minimum of 10' of separation.
- b. Minimum watermain diameters shall be 8" for residential property.
- c. Minimum watermain diameters shall be 12" for multi-family, commercial, industrial, business park, public or waste management property.
- d. Material shall be ductile iron pipe, Class 52, for 6" through 12" watermain. Material for large diameter watermain (over 12") shall be ductile iron and the class of pipe determined on an individual basis.
- e. All connections to existing watermains shall be valved. Locate valves within the street surface where possible. Locate the valve as close as possible to the tee or cross so that the valve can be rodded back to the tee or cross. A minimum of two valves is required at a 3-legged intersection. A minimum of three valves is required at a cross or 4-legged intersection.
- f. All utilities that cross the watermain shall cross at a 90° angle if possible with the minimum requirement of a 45° angle for the crossing.
- g. Dead-end lines shall be minimized by looping of all mains wherever practical. Where dead-end mains occur a hydrant shall be installed at or near the end of the main for flushing purposes. All temporary and permanent dead-ends shall be secured with a gate valve.

- h. All gate valves that are not within paved areas shall be marked per the current version of the *Structure Marker Sign Detail* in the City's General Specifications.
- i. If the watermain is to be installed within private property, the easement shall be a minimum of 20' wide with the watermain centered in the easement.
- j. Watermains shall not be located within any defined or designated ponding easement.

3. Hydrants

- a. All hydrant spacing will be reviewed by Fire Marshal, but the typical maximum spacing permitted between hydrants in multi-family, commercial, industrial, business park, public, or waste management areas are 300' and the typical maximum spacing permitted between hydrants in residential areas is 500'.
- b. Gate valves are required on all hydrant leads.
- c. Hydrants or water services are not allowed on the inactive side of gate valves for temporary stubs.
- d. Hydrants shall be placed per current version of *Typical Hydrant Installation* in the City's General Specifications.
- e. Locate hydrants at all intersections, if practical. Hydrants not located at an intersection shall be aligned with an adjoining property line.

4. Water Services

- a. Single family residences shall have a minimum 1" diameter Type K copper water service.
- b. Water service lines greater than 1" in diameter shall be approved by the City's Building Official based on the Minnesota State Plumbing Code.
- c. Services shall be constructed beyond the ROW line to within 1' of the drainage and utility easement, where topography permits. This will allow the electric, telephone, gas and cable TV companies to install their lines outside of the right-of-way where conditions permit, see the current version of the *Typical Water Service Detail* in the City's General Specifications.
- d. Water services constructed to lots that already have electric, telephone, gas and cable TV service shall be constructed only to the right-of-way line.
- e. The end of all water services shall be plugged and curb stop marked with a 6' T-iron posts painted blue placed vertically and protruding 4' out of the ground. Only one continuous piece will be allowed from main to curb box or valve.
- f. Water services may be placed in the same trench as the sewer services provided that an 18" vertical clearance and a 36" horizontal clearance are maintained, see the current version of the *Typical Water Service Detail* in the City's General Specifications.

- g. All curb stop standpipes constructed in paved areas require the installation of a meter box and cover.
- h. Curb boxes shall be Minneapolis Pattern with stationary rods.
- i. A minimum of 7.5' of cover is required on all water services.
- j. Water laterals and/or services shall not be located within any defined or designated ponding easement.

5. Submittals:

- a. Upon completion of the water utility work, the developer is required to provide the City with a Utility Record Drawing. See the Plan Standards section of this document for further submittal and formatting requirements.

6. Specifications:

- a. See the current City of Rosemount General Specifications and Standard Detail Plates for further watermain construction requirements and for additional information.

IV. SANITARY SEWER

The design and construction of sanitary sewer and sewer services shall conform to the most recent editions of, "**City Engineers Association of Minnesota Standard Utilities Specifications,**" "**Recommended Standards for Wastewater Facilities (Ten State's Standards),**" or as modified herein and the City's most recent Standard Detail Plates, general specifications and comprehensive plans. These comprehensive plans contain information that the design professional must incorporate in the design of a public infrastructure within the City.

The following are specific requirements related to the design of sanitary sewer and sewer services:

1. General

- a. Show or define access routes for maintenance purposes to all manholes and lift stations that are outside of public right of way. Access routes shall have an 8% maximum grade, 2% cross slope, a minimum width of 10' and a turnaround where applicable. If necessary, access easements shall be dedicated at the time of final platting to provide this access.
- b. Any connections to existing manholes shall be core drilled or the opening cut out with a concrete saw. No jack hammering or breaking the structure with a mall is permitted.
- c. No inside drops allowed in manholes.
- d. Changing of material pipe type is not allowed between manholes except for drop manholes.

2. Sanitary Sewer

- a. Sanitary sewer alignment shall follow the centerline of the street unless approved by City Engineer.
- b. The maximum spacing between manholes for sewer mains is 400'.
- c. All manholes shall be at centerline/centerline at intersections.
- d. All manholes shall be located in public right-of-way unless approved by the City Engineer.
- e. All manholes that are not within a paved area shall be marked per the current version of the *Structure Marker Sign Detail* in the City General Specifications.
- f. Manholes are required on the terminus end of all stubs if the line will be active.
- g. The following pipe types and class are identified in general with respect to depths with soil type verification and design criteria required to substantiate size and type of 8" to 10" pipe used.

DEPTH	TYPE & CLASS
8' to 18'	PVC, SDR 35
18' to 26'	PVC, SDR 26
> 26'	As approved by City

- h. Along a deep trunk sanitary sewer (greater than 20' deep), the City may require the Developer to construct a parallel, shallower sanitary sewer that the services would connect to. The shallow sanitary sewer would eliminate the need for deep risers that connect to the trunk sanitary sewer.
- i. If sanitary sewer is to be installed less than 10' deep within private property, the easement shall be a minimum of 20' wide. If the sanitary sewer is 10' deep or greater, then the easement shall be twice as wide as the depth.
- j. The trunk sanitary sewer system shall be designed to promote a laminar flow through the sewer system. Junction manholes should be designed to limit the hydraulic head increase by matching flow lines and by providing good angles of connection, typically greater than 90°. Angles of connection less than 90° are not allowed.
- k. Any manhole located within a designated or defined ponding & drainage easement shall be made of watertight materials.

3. Sewer Services

- a. Single family residences shall have a minimum 4" diameter PVC (SDR 26) sanitary sewer service.
- b. Sanitary service lines greater than a 4" diameter shall be approved by the Building Official based on the Minnesota State Plumbing Code.
- c. When D.I.P. is used for the main sewer line, sanitary sewer services shall be constructed with 4" or 6" D.I.P., Class 52, from the main line sewer to the 45° bend.
- d. Services shall be constructed beyond the ROW line to within 1' of the drainage and utility easement, where topography permits. This will allow the electric, telephone, gas and cable TV companies to install their lines outside of the right-of-way where conditions permit.
- e. Sewer and water services constructed to lots that already have electric, telephone, gas and cable TV service shall be constructed only to the right-of-way line.
- f. The end of all sanitary service stubs shall be plugged and marked with a 6' T-iron fence post, painted green placed vertically and protruding 4' out of the ground.
- g. Cleanouts are required at 100' intervals including the riser on sanitary sewer services. All sanitary sewer cleanouts constructed in paved areas require the installation of a meter box and cover.
- h. Water services may be placed in the same trench as the sewer services provided that an 18" vertical clearance and a 36" horizontal clearance are maintained, see the current version of the *Typical Water Service Detail* in the City's General Specifications.
- i. Sewer services shall not be connected to a manhole unless the structure served is multi-family, commercial, industrial, business park, public, or waste management in use and the connection is

approved by the City Engineer.

- j. The minimum depth of the sanitary sewer service at the right-of-way or easement line shall be 10' unless documented by a proposed house or building elevation that justified a deeper service.

4. Submittals

- a. Upon completion of the sanitary utility work, the developer is required to provide the City with a Record Utility Drawing. See the Plan Standards section of this document for further submittal and formatting requirements.

5. Specifications

- a. See the current City of Rosemount General Specifications and Standard Detail Plates for further sanitary sewer construction requirements and for additional information.

V. STREET CONSTRUCTION

Streets shall conform to the most recent editions of "**Mn/DOT Standard Specification for Construction,**" "**Mn/DOT Road Design Manual,**" "**Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways**" or as modified herein and the City's most recent Standard Detail Plates, general specifications and comprehensive plans. These comprehensive plans contain information that the design professional must incorporate in the design of a public infrastructure within the City.

The following are specific requirements related to the design of street construction:

1. General

- a. On a street with concrete curb & gutter, street width shall be measured from the face of curb to the face of curb.
- b. Maximum length of a cul-de-sac street shall be 700'. The cul-de-sac shall have a 60' radius to the right-of-way line and a 45' radius to the face of curb.
- c. Streets shall be laid out so as to intersect as nearly as possible at right angles.
- d. Barricades in accordance with the Minnesota Manual on Uniform Traffic Control Devices and as approved by the City Engineer shall be placed on all dead end streets.
- e. No street grade shall be less than 1%. At intersections, the street grade shall not exceed 2.0% for the first 100' approaching said intersection. The 100' is measured from the curb line of the intersected street.
- f. In cul-de-sacs, the gutter grade shall not be less than 0.5%. A minimum 0.5' crown or minimum 2% cross slope grade, whichever is greater, is required for a cul-de-sac cross section.
- g. Concrete valley gutters will be constructed where cross-section slopes are less than 1% and/or as directed by the City Engineer.
- h. Soil boring information shall be submitted to the City.
- i. All clay material will be removed within the street section.
- j. The material used for the aggregate base shall be as specified in the current City of Rosemount General Specifications and Standards.
- k. Cul-de-sacs are required on all "dead-end" public streets. Temporary "dead-end" situations associated with phased development do not require concrete curb and gutter along the radius of the cul-de-sac. Temporary "dead-end" situations associated with providing access for future extension to and through adjacent undeveloped property requires concrete curb and gutter installation.
- l. New residential subdivisions will require modified 'S' design curb and gutter as shown on the current *Concrete Curb and Gutter Detail* in the City's General Specifications. B6-18 curb and

gutter is required on all collector streets and at all intersection radii.

- m. A 25' minimum intersection radius shall be used on residential streets. A 50' minimum intersection radius shall be used on non-residential streets.
- n. A pedestrian curb ramp is required when sidewalk or trail way intersect with curbs. The ramp shall be constructed according to the current *Pedestrian Curb Ramp Detail* in the City's General Specifications.
- o. The design and construction of sidewalks and trail ways shall be in accordance with current ADA Standards and the current edition of the **"Mn/DOT Bikeway Facility Design Manual."**
- p. Traffic signs and devices shall be installed under City contract and per "Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways," Mn/DOT, and City of Rosemount Standard Detail Plates.

2. **Submittals**

- a. Upon completion of the street construction, the developer is required to provide the City with a Record Utility Drawing. See the Plan Standards section of this document for further submittal and formatting requirements.

3. **Specifications**

- a. See the current City of Rosemount General Specifications and Standard Detail Plates for further street construction requirements and for additional information.

CONSTRUCTION GUIDELINES

I. SURVEY REQUIREMENTS

The following is a summary of construction staking requirements for improvement projects in the City of Rosemount:

1. Separate cut sheets for:

- a. Sanitary
 - i. Offset distance
 - ii. Benchmark
 - iii. Stationing at 0+00, 0+50, 1+00, and 50 feet thereafter to next manhole
 - iv. Hub elevations
 - v. Pipe/manhole inverts
 - vi. Cuts to invert of pipe
 - vii. Manhole builds
 - viii. Percent grade on each run
 - ix. Wye locations from downstream manhole

- b. Watermain
 - i. Offset distance
 - ii. Benchmark
 - iii. Stationing at 50-foot intervals
 - iv. Hub elevations
 - v. Top of pipe elevations
 - vi. Fitting and valve stationing
 - vii. Hydrants staked to break off
 - viii. Cuts and fills as appropriate

- c. Storm sewer
 - i. Offset distance
 - ii. Benchmark
 - iii. Stationing at 0+00, 0+50, 1+00, and 50 feet thereafter to next manhole
 - iv. Hub elevations at each station
 - v. Pipe/manhole inverts at each structure
 - vi. Manhole/catch basin builds
 - vii. % grade on each run
 - viii. Offsets to back of curb, cuts to invert

- d. Services
 - i. Offset distance
 - ii. Benchmark
 - iii. Hub elevations
 - iv. Sanitary invert
 - v. Cut to invert
 - vi. Elevation to top of curb stop box
 - vii. Cuts/fills to box top or cuts to curb stop

- e. Curb
 - i. Offset distance
 - ii. Benchmark
 - iii. Hub Elevations
 - iv. Top of curb
 - v. Type of curb
 - vi. Cuts/fills to top of curb
 - vii. Begin, middle and ending radius points

2. As-builts

The survey crew will establish X, Y, and Z coordinates on all structures that can be accessed above ground (curb stops, gate valves, manholes, and catch basins) and below ground (all horizontal deflections on sanitary sewer services and all conduit crossings noting intended user) through the use of the GPS system.

3. Utility survey codes

The City shall be provided with an *electronic file copy* of the as-built coordinates for each of the following utility locations that are within the public right-of-way and the drainage and utility easement. The points in this file shall use the following description codes:

#	Description
101	Curb Stop
102	Fire Hydrant
103	Junction Box
106	Water Meter Vault
109	Water Valve
110	Waterline ARV (Air Relief) MH
111	Waterline Bend
112	Waterline Corp
114	Waterline Cross
115	Waterline Curb Box
116	Waterline Hydrant Valve
117	Waterline Plug
120	Waterline Sleeve
121	Waterline Tee
122	Waterline Wet Tap
202	Pump
204	Sanitary Sewer Cleanout
206	Sanitary Sewer FM ARV MH
208	Sanitary Sewer Manhole Invert
209	Sanitary Sewer Manhole Rim
210	Sanitary Sewer Plug
211	Sanitary Sewer Service Bend
212	Sanitary Sewer Service Tee
213	Sanitary Sewer Service Wye
301	Arch Pipe - Flared End
302	Arch Pipe - Invert
306	Corrugated Metal Pipe (Invert)
307	Corrugated Metal Pipe (Top)
308	Environmental Manhole
313	Reinforced Concrete Pipe Invert
314	Reinforced Concrete Pipe Top
317	Storm Drop Inlet Top/Grade

319	Storm Sewer Beehive
320	Storm Sewer Bend
321	Storm Sewer Box Culvert Invert
322	Storm Sewer Boxed Culvert Rim
323	Storm Sewer CB INV
324	Storm Sewer CB Rim
325	Storm Sewer Flared End Section
327	Storm Sewer Manhole Invert
328	Storm Sewer Manhole Rim
351	Drain Tile Bend
352	Drain Tile Clean out
353	Drain Tile Invert
355	Drain Tile Plug
356	Drain Tile Wye
401	Conduit

II. CONSTRUCTION GUIDELINES

The following is a summary of requirements and procedures for construction observers that are assigned improvement projects in the City of Rosemount:

1. Shop drawings

Contractor shall submit six (6) drawings.

- i. Return two (2) to the contractor
- ii. One (1) copy to the City file
- iii. One (1) copy to the observer
- iv. One (1) copy for Engineer file (WSB)
- v. One (1) copy to the Project Manager

2. Field communication

- a. Submit weekly construction reports to City Engineer by Friday. Include list/summary of resident contacts in these reports.
- b. Side deals with contractor and developer need to be documented as solely between two parties. If through City contract, receive written/signed verification of agreement by both contractor and developer.
- c. Document all delays/extensions agreed to or process them in a Change Order.
- d. Only consider invoices for extra work if immediately submitted and documented by observer. Contractor and observer shall agree in field on hours if work is done by time and material.
- e. Weekly progress meeting minutes shall be submitted to the City Engineer at the end of each week.
- f. Document all private utility hits and immediately notify the City Engineer
- g. Field emergency:
 - i. All City of Rosemount representatives will have all small utility emergency contact information available. Notify the following as necessary:

- (1) 911
- (2) City Hall – (651) 423-4411
- (3) City Engineer – (612) 360-1291
- (4) Engineering Department – (651) 322-2022
- (5) Police:
 - (a) Daytime – (651) 423-4491
 - (b) After hours (After 5pm) – (651) 675-5700

- h. Road closure procedure:
 - i. Fill out Rosemount’s Road Closure Notification Form (available on the City website or at City Hall).
 - ii. Create a traffic control signage plan or detour plan if applicable.
 - iii. Submit to Engineering Department for approval and distribution.
- i. Connections to existing mains shall be coordinated with the City Engineer. The City requires a minimum 48-hour notice if residents are to be without water.
- j. Activation of the watermain system shall be performed by City personnel only. The City requires a minimum 48-hour notice before the activation of the watermain system.

3. Data collection

- a. Collect and record location for sewer and water service laterals installed within public rights-of-way at all main line connections, and termination at public rights-of-way as necessary to develop geospatial data.
- b. Water service curb box elevations and sanitary sewer service invert evaluations. This information should be submitted within 14 days to the City, and the Project Engineer once utility work is completed on the project.
- c. See Appendix A for an example of a Utility Service Location Verification Form that contains all required data collection for record drawings and information to be submitted to the City.

4. As-builts

- a. All curb stop boxes and sanitary sewer service ends shall be tied with at least two ties using the following priority:
 - i. The served structure with address, lot and block noted.
 - ii. Neighboring structures with address, lot and block noted.
 - iii. For existing houses or structures, the front corners of the house or building.
 - iv. Fire hydrants or Gate Valves.
 - v. Manholes, catch basins, if curb and gutter is in.
 - vi. Other permanent structures (telephone, pedestals, transformers, bridges, etc.)
 - vii. Power poles, trees, other semi-permanent items.
 - viii. Stationing from a hydrant, manhole, or catch basin. These may be used with back-of-curb distance.
 - ix. Adjacent services

All ties should be less than 100'.
- b. All gate valves shall be tied with at least two ties using the following priority:
 - i. Fire hydrants

- ii. Manholes
 - iii. Catch basins, if curb and gutter are in.
 - iv. Buildings or other permanent items
 - v. Telephone pedestals
 - vi. Power poles, trees, other semi-permanent items
 - vii. Stationing from a hydrant, manhole, or catch basin, if over 100'.
 - viii. Back of curb only when used with stationing in g. above.
 - ix. Curb stops.
- All ties should be less than 100'.

5. Testing procedures

All testing shall be completed by the City's contracted testing firm, City staff, or other City approved agency. Other tests may be required if State or Federal funds are being used on the project. Notify City staff within 48 hours of any scheduled testing. See current City Specifications for testing methods.

- a. Backfill materials in utility trenches are subject to density and testing requirements per City Specification.
- b. Watermain
 - i. Hydrostatic (Pressure)
 - ii. Electrical Conductivity
 - iii. Bacterial (Bug)
- c. Sanitary sewer
 - i. Air or Leakage
 - ii. Deflection (Mandrel) – Performed thirty (30) days after installation
 - iii. Televiser (after jetting) – Within fifteen (15) days of manholes raised for base course paving
- d. Storm sewer
 - i. Visual inspection
 - ii. Lamping
- e. Street construction
 - i. Topsoil per **“Mn/DOT Standard Specifications for Construction”**
 - ii. Gradations for select granular borrow and aggregate base
 - iii. Density test for subgrade and aggregate base
 - iv. Roll test for subgrade and/or aggregate base
 - v. Bituminous per current **“Mn/DOT Standard Specifications for Construction”**
 - vi. Air, slump and compressive strength for concrete
 - vii. Cores on wear course, base course if questionable
- f. Final quantity tabulations shall be submitted to the City for the following:
 - i. Sanitary sewers by footage and size.
 - ii. Watermain by footage and size.
 - iii. Number of Hydrants, G.V., M.H., C.B., lift stations, etc.
 - iv. Storm sewers by footage and size

- v. Number and size of services - sewer
- vi. Number and size of services - water
- vii. Streets by lineal footage and square yards
- viii. Sidewalks by lineal footage and square yards
- ix. Trails by lineal footage and square yards

6. Inspections

- a. Preliminary
 - i. All gate valves to be keyed by City staff prior to final lift.
- b. Final
 - i. Performed after completion of all street construction, including final grading and restoration of boulevards, ponding areas and drainage swales by designated City staff.
 - ii. Punch list of any required corrective work is given to designated City staff.
 - iii. After completion of all punch list items is certified by contractor, corrective work is re-inspected by designated City staff.
- c. Warranty
 - i. The contractor will be contacted by the City of Rosemount by mail to schedule a final walkthrough to create a warranty punch list.
- d. Lift station start-ups:
 - i. Start-up shall be coordinated by the Project Manager.
 - ii. Observer should ensure contractor has demonstrated all parts are in working order.
 - iii. All lift station subcontractors must be in attendance before beginning start-up.
 - iv. O & M's shall be given to the City (include electronic copy).
 - v. City Staff must be present.

PLAN STANDARDS

I. PLAT AND DEVELOPMENT/UTILITY CONSTRUCTION PROCESS

GRADING/EROSION CONTROL – After approval of the Preliminary Plat, a Grading/Erosion Control Plan must be submitted for City review. The Final Grading/Erosion Control Plan must be certified by a Licensed Professional Engineer and approved by the City Engineer.

FINAL PLAT – After Dakota County approval of the final plat, the City must receive signed plat copies (see Final Plat Process for submittal requirements) before street and utility construction can begin or building permits are issued.

CONSTRUCTION PLAN – After approval of the Grading/Erosion Control Plan, a Construction Plan and Specifications must be submitted for City review. Upon final City Engineer approval, provide a final plan set for City Engineer's signature.

CONSTRUCTION PLAN RECORD DRAWINGS – By January 15th of each year, a record drawing of the construction plan is to be submitted for review by City.

GIS UTILITY UPDATE – By March 15th of each year, all utilities for the development/utility construction project will be mapped in a ESRI SDE database format.

II. FINAL PLAT SUBMITTALS

To complete the final plat process, the City requires all developers to submit copies of the County-approved plat that is being recorded. The following copies are needed for City records:

1. One plat set for City signatures on **22" x 34"** Mylar sheet(s) with the following additional information included on the plat:
 - a. City Copy - Not Official Copy and date (month & year) labeled at the top of each sheet
 - b. Street names as assigned by the City
2. One plat set (do not include a separate signature sheet or lot survey) on **22" x 34"** Mylar sheet(s) with the following additional information included on the plat:
 - a. City Copy - Not Official Copy and date (month & year), address map labeled at the top of each sheet
 - b. Street names, block numbers, and lot numbers, **NO survey information**
 - c. Addresses as assigned by the City shown on each individual lot
3. One plat set (do not include a separate signature sheet or lot survey data) on **22" x 34"** Mylar sheet(s) with the following additional information included on the plat:
 - a. City Copy - Not Official Copy and date (month & year), area map labeled at the top of each sheet
 - b. Street names, block numbers, and lot numbers, **NO survey information**
 - c. Square footage of each lot, outlot, park, right-of-way, and easement for ponding purposes shown on each individual lot/easement or in tabular form
 - d. Total acreage of the entire plat

- e. Setback line and each lots front footage at setback
4. One plat set (do not include a separate signature sheet or lot survey data) on **11” x 17”** Mylar sheet(s) with the following additional information included on the plat:
 - a. City Copy - Not Official Copy and date (month & year), address map labeled at the top of each sheet
 - b. Street names, block numbers, and lot numbers, **NO survey information**
 - c. Addresses assigned by the City shown on each individual lot, **NO survey information** (Addresses must be a size that can be legible when it is faxed)
 5. One plat set (do not include a separate signature sheet or lot survey data) on **11” x 17”** Mylar sheet(s) with the following additional information included on the plat:
 - a. Not Official Copy – City Copy and date (month & year), area map labeled at the top of each sheet(s)
 - b. Street names, block numbers and lot numbers, **with survey information**
 - c. Square footage of each lot, outlot, park, right-of-way, and easement for ponding purposes shown on each individual lot/easement or in tabular form
 - d. Total acreage of the entire plat
 - e. Setback line and each lots front footage at setback
 6. Submit the *electronic drawing files* in AutoCAD or ArcMap compatible format projected in Dakota County Coordinate, NAD83 datum of each plat with street names, block and lot numbers, and addresses each on separate layers.

Please be advised that the City will not release the final plat for recording until receipt of the above copies.

III. DEVELOPMENT/UTILITY CONSTRUCTION SUMMITAL SUMMARY

GRADING/EROSION CONTROL, CONSTRUCTION PLAN AND RECORD DRAWING REVIEW – The City’s Project Manager shall be provided with one full size (22” x 34”), one half size (11” x 17”), and one digital image (.pdf) plan set for review.

FINAL GRADING/EROSION CONTROL AND CONSTRUCTION PLAN SUBMITTAL – Along with the *electronic drawing files* (see Mapping Standards for file requirements), the City’s Project Manager shall be provided with three full size (22” x 34”), three half size (11” x 17”), and one digital image (.pdf) set of the City Engineer approved plans.

EASEMENT DRAWINGS – The City shall be provided with *electronic drawing files* of easement documents with signed easement agreement. These drawings should only show existing parcels, rights-of-way, and easements all on separate layers (see Layer Requirements).

CONSTRUCTION PLAN RECORD DRAWINGS – These plans become the City's permanent record of its infrastructure system. Along with the *electronic drawing files* (see Mapping Standards for file requirements), the City’s Project Manager shall be provided with one Mylar (22” x 34”) and

one digital image (.pdf) set of the City approved drawings.

GIS UTILITY FILES – The City’s GIS Coordinator shall be provided with an enterprise geodatabase that contains updated files for only the newly constructed utilities. See the GIS Utility Update section of this document for specific data and layer requirements.

IV. PLAN STANDARDS

The City has certain standards of a plan for infrastructure improvements which are to be owned and maintained by the City. These standards apply to grading plans, construction plans, and record plans. To standardize these plans, the guidelines listed below shall be followed.

1. GENERAL PLAN STANDARDS

These standards apply to **all plan sets** submitted to the City.

- a. Organize plan sheets generally in the following order:
 - i. A title sheet with an index and vicinity map
 - ii. General Utility & Street Plan, details and survey alignment with curve data in tabular form
 - iii. Traffic signs and devices plan sheets
 - iv. Street lighting system plan sheets
 - v. A sanitary sewer and watermain plan & profile sheets
 - vi. Storm sewer and street plan & profile sheets
 - vii. Street cross-sections sheets on state aid projects and as necessary
 - viii. General Grading/Erosion Control Plan (Note: This can be part of the Construction Plan or a separate plan set. See Grading/Erosion Control Plan Standards).
- b. All sheets shall be 22" x 34", numbered consecutively and contain the City's project number.
- c. All street names shall be clearly labeled.
- d. Any revisions must be noted, initialed and signed on all effected sheets.
- e. A standard title block shall be placed on the bottom or right side of each sheet.
- f. All parcels shall be properly labeled with lot and block numbers and plat name, or the complete property identification number in unplatted areas. Developed parcels shall have their address shown on the plan.
- g. All plans shall have properly placed North arrows for each plan on the sheet.
- h. The direction North will be orientated either up or to the right on all plan sheets.

2. GRADING/EROSION CONTROL PLAN STANDARDS

The following standards are specific to Grading/Erosion Control Plans.

- a. The title block will include the subdivision name, developer and engineer contact information.
- b. The full size scale shall be 1" = 50' or 1" = 30'.

Provide a grading/erosion control drawing plan certifying grades of structure pads, lot corners, front and rear building ground grades, driveway grades, lowest floor elevations of structures existing and proposed, and ponding areas. Additional items to be shown include lot number, block number, style of home (rambler, walk out, etc.) drainage arrows and garage side of building.

- c. Provide soil boring locations and information.
- d. Provide calculations and drainage area maps showing 10-year and 100-year flood boundaries verifying the adequacy of the number of catch basins, pipe capacities and pond sizes.
- e. Provide calculations verifying watermain sizing.
- f. Provide calculations verifying sanitary sewer sizing.
- g. Provide an R-value from an accepted laboratory and calculations verifying pavement thickness.
- h. Provide copies of permit applications or submit for signatures.
 - i. Minnesota Pollution Control Agency for sanitary sewer extension and NPDES for stormwater
 - ii. Army Corp of Engineers
 - iii. Minnesota Department of Natural Resources
 - iv. Minnesota Department of Health
 - v. Metropolitan Council, Environmental Services, letter (with copy of MPCA permit)
 - vi. Minnesota Department of Transportation
 - vii. Dakota County Transportation

3. CONSTRUCTION PLAN STANDARDS

The following standards are specific to Construction Plans.

- a. Full size scale: Horizontal Scale: 1" = 30' or 1" = 50'
 Vertical Scale: 1" = 5'
- b. The following utilities shall be located in the approximate locations:
 - i. Sanitary Sewer: On the centerline of street right-of-way.
 - ii. Watermain: Ten feet north and east of the centerline and parallel to the sanitary sewer.
 - iii. Storm Sewer: Ten feet south and west of the centerline.
- c. Index map shall be shown on each plan sheet in the upper right corner.
- d. All detail drawings shall be on separate sheets or included in the specification manual except as required on State Aid projects.
- e. The profile shall be directly below the plan with the stationing aligned as closely as practical. Stationing shall be shown on both the plan and profile views.

- f. All match-line breaks shall be clean with reference points and plan sheet numbers of continuation clearly marked. All plans which are broken by a match-line shall be on the same or consecutive sheets.
- g. Existing utilities shall be shown and labeled as existing for the subdivision and adjacent land in both the plan and profile views. Existing utilities shall be shown beyond plat boundaries for at least 200' and to the nearest existing valve or manhole required for construction.
- h. When drafting utility and/or street plans, use a solid line for new utilities and a dashed line for existing utilities.
- i. Locations of overhead and underground gas, electric, cable, telephone lines, pipelines, etc. and their respective easements shall be shown.
- j. Horizontal and vertical scales shall be shown on all plan sheets for utility and street plans.
- k. Existing and proposed street lighting shall be shown for the subdivision and at least 200' beyond the subdivision boundaries.
- l. Project numbers shall be shown in upper right hand corner of each plan sheet.
- m. The watermain, sanitary sewer, and storm sewer shall be shown in the profile with the appropriate information such as size, material, length, and grade.
- n. All structures shall be shown in tabular form with top of casting (catch basins defined as gutter line), invert, and sump elevations under each structure in the profile view.
- o. Storm sewer plans should be on a separate sheet from sanitary sewer and water but on the same sheet as the street plans.
- p. Utility crossings shall be highlighted in the plan & profile views.
- q. Show flow direction arrows in the plan section of the plan and profile.
- r. Stationing of sanitary sewer wyes shall be shown with an "S" in front of the stationing. Stationing will either be from the street centerline or downstream manhole.
- s. All sanitary services shall be drawn on the plan to the constructed length with length noted. Indicate if jacked.
- t. If sanitary sewer wye only is constructed, it shall be noted as "Wye Only" after the sewer stationing.
- u. The approximate invert elevation at the end of all sanitary sewer service stubs (tails) shall be shown on the plans. If risers are placed, the height of each shall be shown on the plans and each shall be drawn on the profile.

- v. All manholes shall be numbered and stationed in both plan and profile.
- w. Stationing of water curb boxes shall be shown with a "W" in front of stationing.
- x. All water services shall be drawn to constructed length and length noted if other than to property line. Indicate if jacked.
- y. All water fittings should be labeled as to size and type such as bends, tees, plugs, etc.
- z. The size and type of all sanitary sewer and water services shall be noted on the plans.
- aa. On combination sewer and water projects, services may be placed in the same trench. This shall be noted on the plans and "S & W" shall be placed before the stationing.
- bb. Storm sewers shall be screened in the plan and profile on the sanitary sewer/watermain sheets. The watermain and sanitary sewer shall be screened in the plan and profile on the storm sewer/street sheets.
- cc. The utility construction plans and street construction plans shall show the centerline stationing.
- dd. The street construction plans shall include a grading plan or cross sections. A typical street section shall be included on the detail sheet.
- ee. Each street plan sheet shall show right-of-way width, street width (face of curb to face of curb), and a typical radius dimension at intersections.
- ff. Proposed horizontal alignment data shall be shown on the sanitary sewer/watermain and storm sewer/street plan sheets.
- gg. Existing and proposed vertical alignment data shall be shown on the storm sewer/street plan sheets. Turn off text on the watermain/sanitary sewer plan sheets.
- hh. The street construction plans shall show directional arrows for drainage. High points shall be labeled as such.
- ii. If the gutter line or ditch grades are different from the centerline, separate profiles need to be shown.
- jj. Show ponds, wetlands, lakes, streams or marshes.
 - i. Show the City's most recent Surface Water Management Plan pond number, NWL and HWL for ponds.
 - ii. Show the NWL and HWL for ponds and wetlands.
 - iii. Show professionally delineated wetland boundaries according to the "Minnesota Wetland Delineation Field Guide" or the 1987 Corp of Engineers "Wetland Delineation Manual".
 - iv. Show OHWL elevation and DNR pond number if applicable.
 - v. U.S. Fish & Wildlife classification if applicable.
 - vi. Storage volume proposed.

4. RECORD DRAWING PLAN STANDARDS

The following standards are specific to Record Drawing Plans.

- a. Unnecessary construction information shall not be shown on the record plans. See Mapping Standards for electronic drawing file and specific layer requirements.
- b. Each sheet shall have the following information displayed on it (see record drawing AB# 2356 and AB# 2365 in Appendix B for Sanitary Sewer/Watermain and Street/Storm Sewer sample sheets):
 - i. A key map will be placed in the upper right hand corner to show location of plan sheet in conjunction with the project, along with the City Project Number and the unique as-built number.
 - ii. Pavement cross section including street width (face to face) on street and storm sewer sheets.
 - iii. Record Drawing stamp with the following text “Information is furnished without warranty as to accuracy. Users should field verify locations and elevations”.
 - iv. The project engineer, construction observer, and month/year the project was as-built shall be listed in a separate box.
 - v. A minimum of two bench marks shall be placed on all sheets. Top of the hydrant is an acceptable bench mark, but Dakota County Monuments shall be shown. Bench marks shall be shown for all hydrants on a project.
 - vi. The bottom of each as-built sheet show the following:
 - (1) Contractors' name
 - (2) City Project number
 - (3) The text “Record Drawing” followed by year completed
- c. New and changed information on as-built plans shall be lettered in italics and in a separate layer in the CAD drawing.
- d. Top nut elevation shall be shown on each new hydrant.
- e. Per City Policy P-5 on Minnesota Office of Pipeline Safety (MnOPS), the location information for the following data that is collected on a project is to be displayed on a **separate** record drawing plan sheet.
 - i. This sheet should only have the utilities, conduit crossings, ROW, lot and block/address information, and MnOPS location information.
 - ii. The MnOPS record drawing sheet number and unique as-built number shall have the letter “L” after the same number as the corresponding record drawing plan sheet.
 - iii. See record drawing AB# 2356L in Appendix B for MnOPS sample sheet.

MAPPING STANDARDS

I. ELECTRONIC DRAWING FILES

The actual data for the City Engineer approved construction plan and record drawing should be submitted to the City's Project Manager in AutoCAD or ArcMap compatible format projected in Dakota County Coordinate, NAD83 datum. Include with the electronic AutoCAD files all pen tables used for plotting. All electronic submittals will include metadata (description of files and explanation of data layers).

II. LAYER REQUIREMENTS

To standardize all electronic file submittals, the City has the following requirements:

1. File format (These items need to be correct before we will continue further review of the electronic files.)
 - a. Information is in Dakota County Coordinate System
 - b. Special Characters – **Do not** use special characters (i.e. \$,_,-) while naming files or layers. Be sure to review layer names after binding and before submitting electronic files.
 - c. All polygons and polylines must be snapped and closed.
2. For Grading Plans, Construction Plans and Record Drawings, the following data should be on separate layers in the electronic drawing file. The names for these layers shall unique and clearly labeled accompanied by metadata:
 - a. General
 - Legend, bar scales, north arrows, headings and sheet numbers, match lines and text, sheet references, and general information
 - Removals, hatching, shading, etc.
 - b. Existing
 - Underground utilities (gas, electric, telephone, cable TV)
 - Property lines
 - Right-of-way lines
 - Easements
 - Sanitary sewer and services
 - Sanitary sewer text
 - Water main and services
 - Water main text
 - Storm sewer
 - Storm sewer text
 - Draintile and draintile service stubs
 - Draintile text
 - Curb line or edge of pavement
 - Contours
 - Contour text
 - Curb
 - Edge bituminous
 - Tree
 - Topo
 - Retaining wall

- Sign
 - Pp/tb/tv box
 - Text for miscellaneous exiting items
- c. Proposed
- Sanitary sewer
 - Sanitary sewer text
 - Sanitary sewer services
 - Sanitary sewer service text
 - Water main
 - Water main text
 - Water main services
 - Water main service text
 - Storm sewer
 - Storm sewer text
 - Draintile
 - Draintile text
 - Curb lines, walks, trails, etc.
 - Street construction text
 - Street centerline
 - Vertical alignment
 - Vertical alignment text for grading when applicable
 - Contours
 - Contour text
 - Easements (Each type of easement will be on a separate layer)
- d. Record drawing
- Record drawing text
 - Street signs (Each type of sign will be on a separate layer)
 - Street lights
 - Sidewalk/Bike trail centerline, material, and width

III. GIS UTILITY UPDATES

The City of Rosemount maintains all utility data in a GIS. To develop a consistent, comprehensive procedure for the development of this GIS, the City has created the following guidelines.

1. Procedure

- a. Convert utility CAD drawing to SDE database for each project. Note: the same utility drawing must be used for each as-built sheet.
- b. Merge all developments together.
- c. Separate utilities into SDE feature classes.
- d. Export temporary geometry file for interim use at City office or create an ArcGIS Server link to the City server.
- e. Export CAD drawings into png image format using unique as-built number as file name.
- f. Link digital as-built to geometry file.
- g. Add attribute data to geometry file.
- h. Perform quality control on data
- i. Update City SDE database

2. Updated Layers

- a. Sanitary Sewer
 - i. Lines
 - (1) Sanitary sewer
 - (2) Sanitary sewer service
 - ii. Points
 - (1) Sanitary sewer lift station
 - (2) Sanitary sewer structures
 - (3) Sanitary sewer service at D/U easement
 - iii. Annotation
 - (1) Sanitary sewer pipe diameter
 - (2) Sanitary sewer pipe length
 - (3) Sanitary sewer manhole ID

- b. Storm Sewer
 - i. Lines
 - (1) Storm sewer
 - ii. Points
 - (1) Storm sewer lift station
 - (2) Storm sewer structures
 - iii. Annotation
 - (1) Storm sewer manhole ID

- c. Watermain
 - i. Line
 - (1) Watermain
 - (2) Water service
 - ii. Point
 - (1) Water tower
 - (2) Water well
 - (3) Gate valve
 - (4) Hydrant
 - (5) Curb stop
 - iii. Annotation
 - (1) Watermain size

- d. Miscellaneous
 - i. Lines
 - (1) Street centerline
 - (2) Sidewalk centerline
 - (3) Easements
 - (4) Right of Way
 - ii. Points
 - (1) Street signs
 - (2) Street lights

Appendix A:

Utility Service Location Verification Form



701 Xenia Avenue
 Suite 300
 Minneapolis, MN 55416
 Tele: 763-541-4800
 Fax: 763-541-1700

Utility Service Location Verification Form

Date Completed: _____

WSB Proj. No.: _____

City Proj. No.: _____

Client: City of Rosemount _____

Field Representative: _____

Contractor: _____

Project Name: _____

Street	Block	Lot	Sanitary Sewer Service						Water Service		Special Notes		
			Wye Sta.	Bend Sta.	Bend Offset	Bend Sta.	Bend Offset	Service Invert EL	Lateral Length of Service	Corp Sta.		Lateral Length of Service	
COACHFORD AVENUE	Block 1	1										Existing Sanitary Sewer Service	
		2											
		3											
		4											
		5											
		6											
		7											
		8											
		9											
		10											
	Block 8-A	3											
		4											
		5											
		6											
		7											
		8											
		9											
		10											
		11											
		12											
		13											
		14											Existing Sanitary Sewer Service
CARRACH AVENUE		3-A	17										
		Block 5-A	1										
	2												
	3												
	4												
	5												
	6												
	7												
	6-A	8											
	Irrigation												

Certification:
 I certify that the information shown on this form in regards to utility service locations is accurate, and that the services were installed in accordance with the plan and cut sheets provided, and that any service locations not installed in accordance with the plans or cut sheets have been noted appropriately on this form, and that a survey crew has surveyed all horizontal bends prior to backfilling the utility trenches.

Contractor: _____ Job Title _____
 (foreman, project manager, etc.)

Subcontractor: _____ Job Title _____
 (if utility work was performed by a subcontractor) (foreman, project manager, etc.)

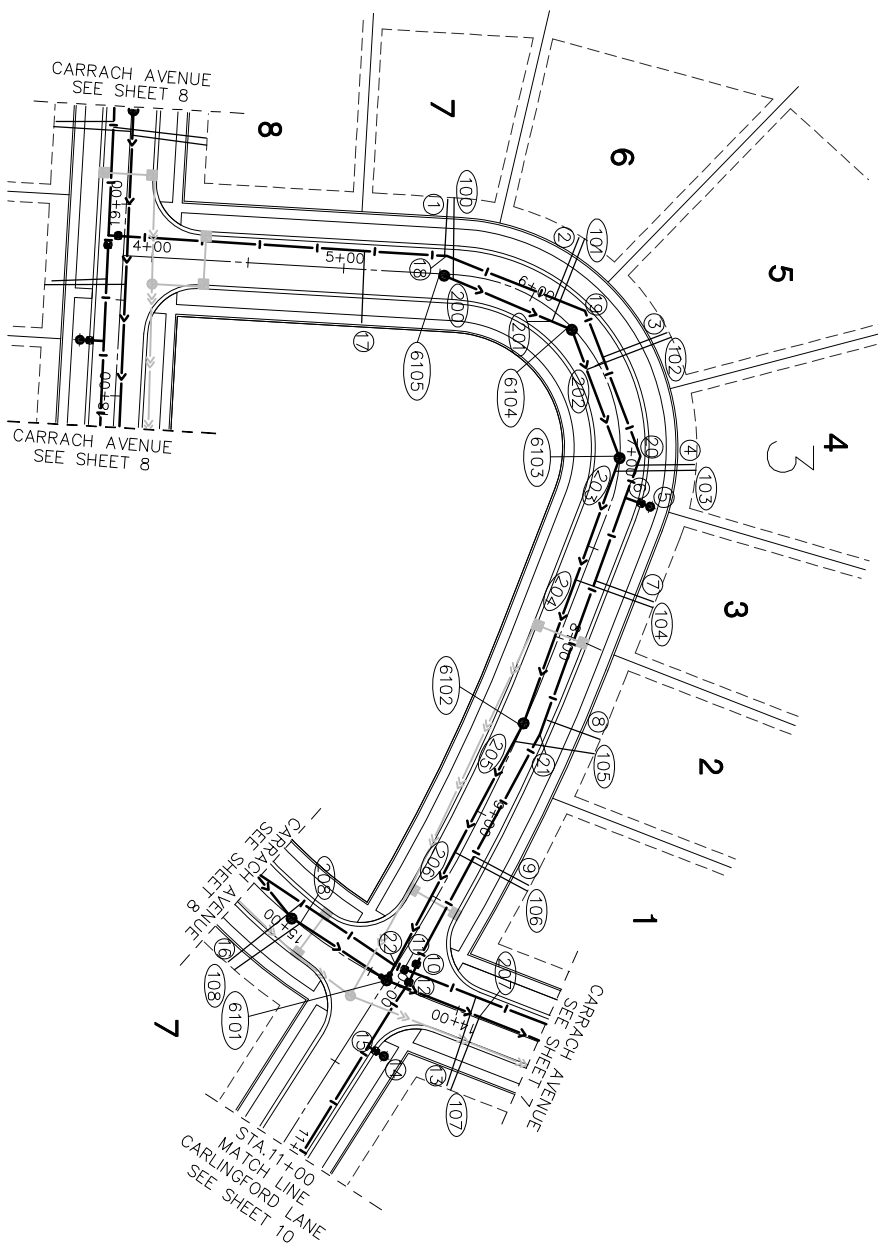
Construction Observer: _____

Project Manager/Engineer: _____

Appendix B:

Sample Record Drawings

CARLINGFORD WAY / CARLINGFORD LANE

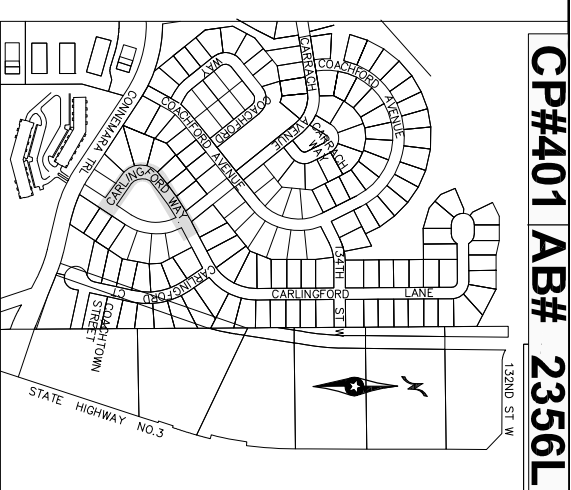


RECORD DRAWING
 INFORMATION IS FURNISHED WITHOUT WARRANTY AS TO ACCURACY. USERS SHOULD FIELD VERIFY LOCATIONS AND ELEVATIONS.

THIS DRAWING IS OUR RECORD KNOWLEDGE OF THE PROJECT AS CONSTRUCTED
 MORGAN DAWLEY, P.E. — PROJECT ENGINEER
 WSB & ASSOCIATES
 CHRIS HARTZELL, EIT — CONSTRUCTION OBSERVER
 WSB & ASSOCIATES
 FEBRUARY 2007

WATERMAIN				SANITARY					
Point	Northing	Easting	Elev.	Desc.	Point	Northing	Easting	Elev.	Desc.
1	202072.58	548739.87		Curb Stop	100	202073.54	548736.54	967.63	San. Service Stub (Inv.)
2	202124.07	548690.41		Curb Stop	101	202126.02	548688.36	967.26	San. Service Stub (Inv.)
3	202189.61	548675.51		Curb Stop	102	202192.93	548674.94	966.10	San. Service Stub (Inv.)
4	202256.73	548697.87		Curb Stop	103	202259.39	548698.47	964.71	San. Service Stub (Inv.)
5	202263.84	548728.86		Hydrant (TNH)	104	202310.11	548753.69	963.66	San. Service Stub (Inv.)
6	202262.01	548730.49		Gate Valve	105	202360.71	548818.20	962.34	San. Service Stub (Inv.)
7	202307.58	548751.69		Curb Stop	106	202405.34	548884.05	960.35	San. Service Stub (Inv.)
8	202355.76	548811.73		Curb Stop	107	202475.01	548970.58	958.52	San. Service Stub (Inv.)
9	202403.37	548881.91		Curb Stop	108	202364.39	549036.75	961.23	San. Service Stub (Inv.)
10	202409.37	548953.10		Gate Valve	200	202110.32	548758.36	966.92	Sanitary Wye
11	202408.62	548959.79		Gate Valve	201	202154.59	548724.65	965.62	Sanitary Wye
12	202415.53	548961.13		Gate Valve	202	202185.54	548721.58	964.59	Sanitary Wye
13	202471.99	548971.03		Curb Stop	203	202238.69	548735.55	962.82	Sanitary Wye
14	202442.46	548992.18		Hydrant (TNH)	204	202277.14	548781.01	961.55	Sanitary Wye
15	202439.86	548993.24		Gate Valve	205	202334.35	548851.06	959.68	Sanitary Wye
16	202359.31	549037.48		Curb Stop	206	202369.05	548906.32	958.35	Sanitary Wye
17	202105.79	548810.86		Curb Stop	207	202449.73	548938.45	948.89	Sanitary Wye
18	202097.97	548755.13		Bends	208	202360.61	548994.77	957.77	Sanitary Wye
19	202158.86	548707.00		Bends	6101	202409.32	548970.68	970.46	Sanitary MH (T/C)
20	202238.54	548719.75		Bends	6102	202328.58	548942.16	972.25	Sanitary MH (T/C)
21	202337.71	548837.54		Bends	6103	202233.97	548729.71	975.59	Sanitary MH (T/C)
22	202404.94	548962.81		Bends	6104	202163.69	548717.94	977.23	Sanitary MH (T/C)
					6105	202106.17	548761.42	978.44	Sanitary MH (T/C)

Note: Sanitary service stub locations are approximate. Must be verified in the field.



CP#401 AB# 2356L

CONTRACTOR : A-I CONSTRUCTION, INC.

RECORD DRAWING 2007

CITY PROJECT # 401

SANITARY SEWER AND WATERMAIN
 CARLINGFORD WAY

SHEET 9 OF 38 SHEETS



EVERMOOR'S GLENDALOUGH 7TH ADDITION
 STREET & UTILITY CONSTRUCTION
 ROSEMOUNT, MINNESOTA

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
 MORGAN DAWLEY, P.E.
 DATE: MARCH 21, 2006 LIC. NO.: 44178

SCALE: AS NOTED	REVISION NO. DATE	EXPLANATION
PLAN BY: MRJ	DESIGN BY: JDH	
CHECKED BY: BDC	PROJECT NO: 01556-63	
RECORD COPY BY: TM/GL	DATE: 2/07	