8.0 Infrastructure

The following chapter summarizes and describes the proposed basic infrastructure requirements necessary to adequately serve the Plan Area and includes a discussion on the "backbone" sewer, domestic water, reclaimed water, and drainage systems for the City of Ceres. It will address both the build-out solutions and possible interim solutions that will allow phasing of the development. The following information is presented at a conceptual planning level, to provide a general overview of the distribution network and location of the proposed infrastructure. A qualified engineer will need to verify the exact locations and sizing of the proposed facilities during the future entitlements process (Parcel Maps and/or Tentative Maps) as future City of Ceres goals and/or land owner direction may dictate possible land use changes. Infrastructure master plans revisions will be allowed by the City and considered consistent with the Specific Plan, once a review has taken place and a determination made, that the intent and expected level of service is met and does not result in major land use changes of the Specific Plan area. All revisions will be subject to review and approval from the City of Ceres Planning and Building Division and Public Works Department.

8.1 INFRASTRUCTURE FACILITIES GOAL AND OBJECTIVES

The Infrastructure Facilities Goal is to provide an efficient system of public facilities that accommodates the needs of the future residents within the WLSP area.

- **Sewer Infrastructure Objective 1** - Ensure provisions for the conveyance, adequate wastewater treatment, disposal and storage capacity to accommodate the WLSP.
- **Drainage Infrastructure Objective 2** - Ensure provisions to adequately provide storm drainage facilities and storage within the WLSP.
- **Water Infrastructure Objective 3** - Ensure provisions of a water system with adequate supply, transmission, treatment and storage facilities to meet the needs in the WLSP.

8.2 SEWER

The City of Ceres' Wastewater Division, within the Public Works Department will maintain the sewage collection system contained within the Plan Area, including collection and transmission facilities as well as disposal. Treatment of the Plan Area wastewater will occur at the City's Wastewater Treatment Plant (WWTP) located east of the Plan Area, near the intersection of Service Road and Morgan Road. The sewer system with all the appurtenances shall be designed to be consistent with existing General Plan policies and City of Ceres standards and specifications, which are in effect at the time of construction.

8.2.1 Existing Conditions

At the time of this plan preparation, developed parcels within the Plan Area are currently being served by one of three means; 1) service from the City of Modesto, 2) service from the City of Ceres and 3) private septic systems. Portions of the areas east of Crows Landing and south of Whitmore Avenue include parcels which are currently being serviced by the City of Modesto. Included are parcels in APN's 086-015-019 (G3 ENTS Inc.), 086-015-020 (G3 ENTS Inc.), 086-015-021(G3 ENTS Inc.), 086-015-015 (Stanislaus County) and a portion of APN 086-015-014 (Stanislaus County), which are served by an existing sewer system comprised of a series of gravity sewers, pump stations, lift stations and a force main network conveying wastewater flows north to the City of Modesto WWTP (See Figure 8-1). The Parcel (APN 086-015-016) east of Crows Landing Road and north of East Hackett Road (See Figure 8-1) is currently being served by an existing sewer system comprised of gravity sewers, lift stations and a force main network conveying wastewater flows east to the City of Ceres WWTP. Parcels (APN 086-015-005, Portion of APN 086-015-014) east of Crows Landing Road and north of Service Road (See Figure 8-1) are also currently being served by an existing sewer system comprised of gravity sewers, conveying wastewater flows east to the City of Ceres WWTP. Portions of unincorporated parcels within the County and within the Plan Area use private septic systems which are expected to remain active until a mechanism is in place to convert those properties to one, being served by the City of Ceres public sewer system. All septic systems will need to be abandoned per local and state requirements once those properties connect to the city's wastewater system. The existing commercial and industrial properties currently being served by the City of Modesto have previous agreements for service that are expected to remain in place and service remaining unchanged. It is intended that all newly developed properties in the WLSP area will be served by the City of Ceres sewer facilities.

8.2.2 Sewer System Overview

The following provides a brief summary of the sewer sheds analyzed for the WLSP, the proposed ultimate "backbone" sewer system and reviews possible interim solutions to provide service to portions of the Plan Area on phased basis.

8.2.2.1 Service Area Limits

The service area of the WLSP is bounded by Whitmore Avenue on the north, Service Road on the south, Ustick Road on the west and the Union Pacific Railroad on the east (contiguous with the boundaries of the Specific Plan). Sewage generated in the Plan Area will be collected and conveyed by both gravity mains with limited use of force mains (See Figure 8-1). Lift stations are anticipated to provide for conveyance of flows to existing gravity lines in Service Road, which will direct flows east to the City of Ceres WWTP. The City's WWTP is located east of the Plan Area south of Service Road between Morgan Road and Blaker Road. The WWTP is approximately 200 acres, with facilities that include the headworks, aeration ponds and percolation ponds. The WWTP currently treats approximately 3 million gallons per day (mgd) and has a treatment capacity of 4.2 mgd and a disposal capacity of approximately 3 mgd Disposal capacity is comprised of approximately 2 MGD currently being disposed onsite and approximately 1 MGD conveyed offsite to the City of Turlock for disposal. The WWTP provides primary and some secondary treatment to the incoming wastewater. The City does not discharge treated wastewater into a waterway, therefore full secondary or tertiary treatment is not currently being applied. The Average Wet Weather Flow (AWWF) is 3.3 mgd and the Peak Wet Weather Flow (PWWF) is 5.5 mgd which necessitates the WWTP to store wastewater onsite until treated during the wet season. The site includes capacity for such storage. In 2007 the City treated an average of 2.9 mgd. This results in approximately 1.3 mgd of available treatment capacity and 0.1 mgd of available disposal capacity (1.1 mgd when the additional Turlock disposal is exercised, see below). There is adequate capacity to accommodate anticipated future growth through 2015. The WWTP NPDES permit currently is for 4.2 mgd, which meets the WWTP designed capacity. The City also has an agreement with the City of Turlock for disposal of an additional 1.0 mgd via the existing 16-inch force main, which provides for the disposal capacity to Turlock to be increased to 2 mgd. The City also has an agreement with the City of Modesto to treat 1.6 mgd from the North Ceres Sewer Area. This flow is received directly by the Modesto system and does not pass through the Ceres WWTP.

8.2.2.2 Flow Estimates

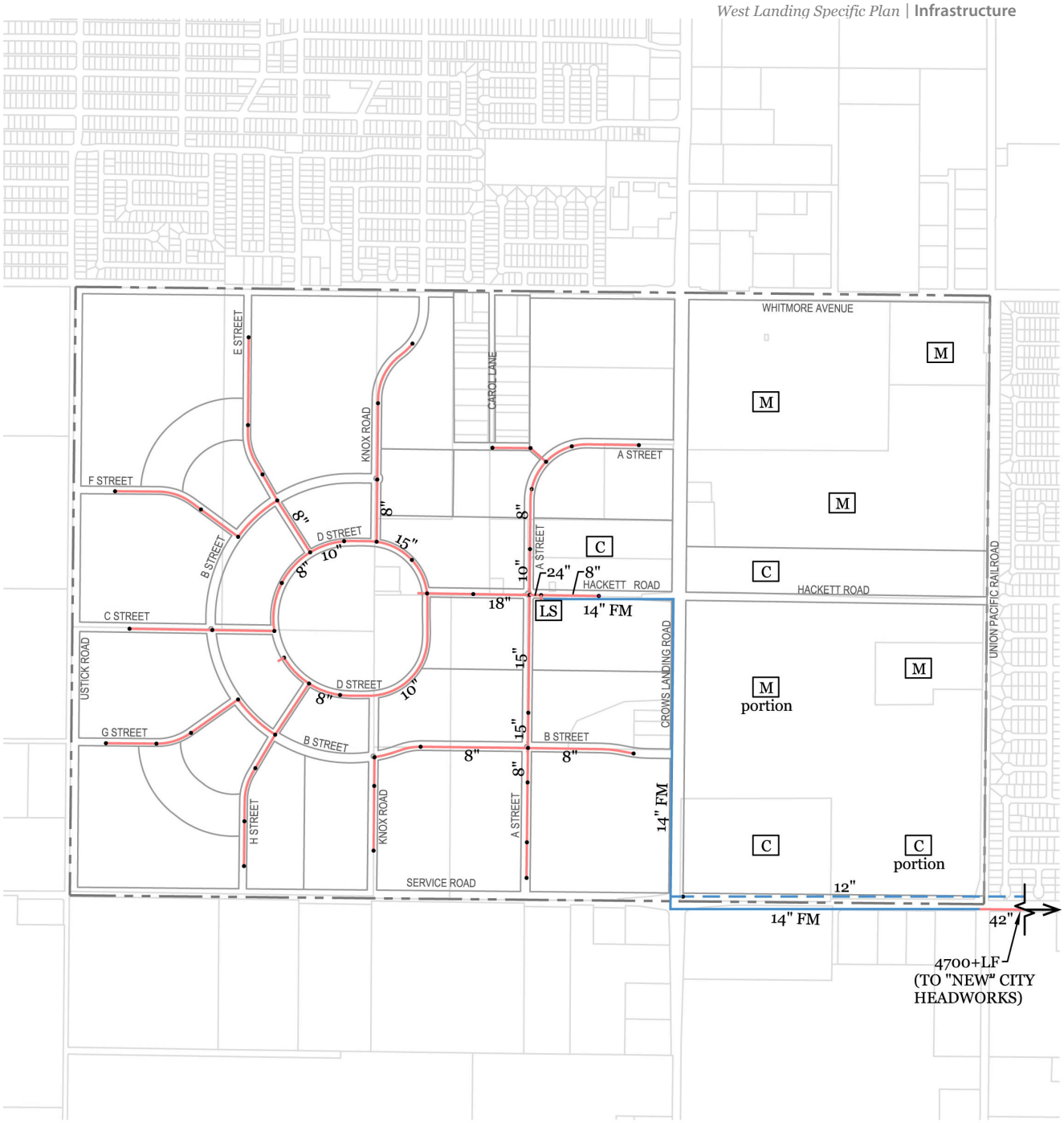
The WLSP at full build out will generate in an estimated peak wet weather flow of 3.68 million gallons per day (mgd). The average dry weather flow (ADWF) and Infiltration and Inflow (I/I) combined flow generated for the WLSP is estimated at 1.61 MGD.

8.2.2.3 Proposed Trunk Backbone Layout

The backbone sewer system, proposed for the WLSP will be located within existing and proposed road right-of-ways of this development area. In the "build-out condition", the entire Plan Area will be served by a combination gravity sewer system, lift station and force main connecting to a permanent regional lift station located east of the Plan Area. The backbone trunk sewer system within the Plan Area is illustrated in Figure 8.1. Off-site systems are discussed in sections 8.2.2.a of this document. In addition to the backbone sewer lines shown by this exhibit, there will be a network of smaller sewer collection lines located throughout the Plan Area sized consistent with the latest edition of the City of Ceres Improvement Standards. The size and location of these additional lines will be determined by a qualified engineer during the future entitlements phase and will be subject to review and approval from the City of Ceres Department of Public Works.

8.2.2.4 Construction Phasing

Due to the timing and magnitude of the required sewer line extensions and major infrastructure improvements required for the ultimate build-out of the WLSP Area. It is anticipated that in the interim the WLSP lift station will direct sewage flow via a sewer force main, south from Crows Landing Road to Service Road and discharge into an existing 12" gravity line. It is anticipated that prior to "build out" of Phase 1 of the improvement area that additional sewer facilities be constructed in Service Road, from Crows Landing Road to the eastern Boundary, to adequately serve the WLSP Area as well as future growth areas to the west and south. The WLSP Area will be required to enter in a "Cost Sharing" agreement with the City for these facilities. Consideration for interim sewer facilities including directing temporary sewage to Modesto and/or "onsite" storage will be reviewed and considered on a case-by-case basis by a qualified engineer and will be subject to review and approval from the City of Ceres Department of Public Works.



Legend

- Sewer Main
- Sewer Force Main (FM)
- Existing Sewer Force Main
- LS — Sewer Pump Station
- C — Ceres Sewer Service Provider
- M — Modesto Sewer Service Provider
- Boundary
- FM — Force Main

Figure 8.1: Backbone Sewer	Date: January 2011
West Landing Specific Plan Ceres, California	NOT TO SCALE

8.2.3 Sewer Service Standards and Guidelines:

1. The City of Ceres General Plan Citywide policy mandates public sewer service for new residential developments of densities greater than one-half unit per acre. Consistent with this policy, the Specific Plan will be served by a public sewer system.

2. Building permits or improvement plans for proposed projects shall not be approved until an approved Sewer Study is completed as part of the Tentative Map process. The Sewer Study shall confirm the design factors for the collection system, including any necessary over sizing per the Wastewater Master Plan and confirm the available capacity for wastewater treatment and disposal is currently available.

3. Construction of public trunk and collector sewers shall be required to the satisfaction of the City of Ceres.

4. Interim facilities such as temporary lift stations and force mains, discharge of flows to the City of Modesto or storage shall be designed in consultation with the City of Ceres.

5. Development projects shall participate in the cost of constructing master infrastructure facilities. Determination of fair share costs, timing and funding mechanisms for master infrastructure facilities are discussed in the Financing Plan (Chapter 10).

8.3 DRAINAGE AND HYDROLOGY

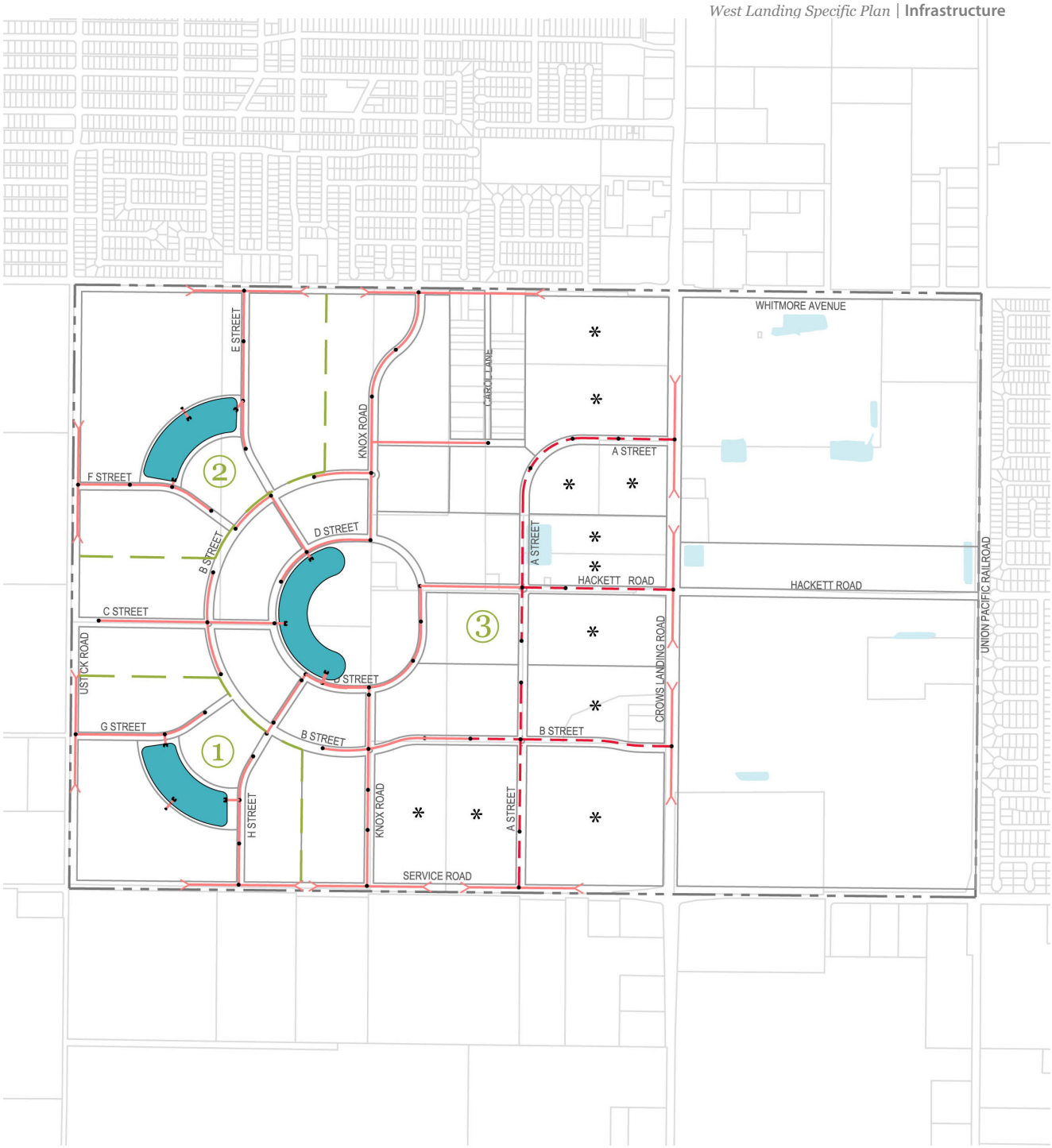
The following section summarizes the information contained within the "Drainage Master Plan for the WLSP" prepared by Wood Rodgers, Inc. This document is part of the technical studies on file prepared in support of the Specific Plan and EIR. The drainage system with all the appurtenances shall be designed to be consistent with existing General Plan policies, the City of Ceres Improvement Standards and Specifications, which are in effect at the time of construction, as well as the Stanislaus Storm Drainage Design Manual (Latest Edition).

8.3.1 Existing Conditions and Planned Developments

The City of Ceres' Public Works Department will maintain the drainage collection systems and retention basins contained within the WLSP consistent with the City's Storm Drainage Master Plan. The Plan Area is essentially flat, with an average slope across the Plan Area of approximately 0.15 percent. On-site elevations range from 83 feet above mean sea level (msl) near Whitmore to 77 feet msl near Service Road, and surface flows move in roughly a south easterly direction. Most of the natural drainage courses in the area have been altered by agricultural activities, and surface water flows are directed into

agricultural and roadside ditches. Site development will necessitate the need for Plan Area retention basins (Figure 8.2). It is anticipated that the design of these "dual use" basins and park areas, maximize the amount of usable area by using a "tiered" grading design to provide additional land opportunities to place facilities for the communities use. Previously developed parcels include onsite provisions to handle the local storm drainage run-off for their property. The existing collection system contains a series of gravity drainage pipes as well as appropriately sized retention basins.

It is important to note that the WLSP area contains Turlock Irrigation Facilities (TID) that serves the agricultural needs of portions of this area, as well as areas to the south and west. Agricultural land use is planned on being retained to the extent possible and doing so will require certain TID facilities to remain or be relocated as development occurs.



Legend

- Approximate Location of Proposed Retention Basins
- Approximate Location of Existing Retention Basins
- (1) Drainage Shed Areas
- Drain Pipe Network
- * Internal Onsite Drainage Facilities Required
- Drainage Pipe, Roadway Collection Only
- Boundary

Figure 8.2: Backbone Drainage			Date: January 2011
West Landing Specific Plan Ceres, California	NOT TO SCALE	N	WOOD RODGERS DEVELOPING INNOVATIVE DESIGN SOLUTIONS

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8.3.2 Drainage System Overview

The proposed Drainage Master Plan for the WLSP has been designed to redirect storm water runoff toward the proposed drainage retention facilities located throughout the Plan Area (Figure 8.2) via a gravity storm drainage collection piping network. It is envisioned and planned that all non-residential development will retain all storm water on site. The drainage retention facilities will be sized and designed considering the concept of "Joint Use" where as portions of these basins will serve as an amenity to the public in the depicted neighborhoods, allowing active and passive use for members of the community. During the normal cycle of storm events, these basins will allow the natural settling and percolation of the storm water. Locations, sizes and percolation rates shall be verified by a qualified engineer during the future entitlements process (Parcel Maps and or Tentative Maps) and will be subject to review and approval from the City of Ceres Department of Public Works.

8.3.3 Water Quality and Detention Facilities

It is anticipated that as the neighborhoods and communities develop, consideration will be given to additional/alternative means of capturing the storm drainage run-off, through means such as grassy roadside swales, and landscaped swales within parking lots, which will provide required water quality benefits, since they will be landscaped with grasses and other plant materials. Ultimately this will reduce the overall size and volume of the retention basin and need for additional storm drainage conveyance systems.

8.3.4 Drainage Standards and Guidelines:

1. All storm drainage storage facilities within the WLSP shall be designed using a 50-year storm or greater. Storm drainage basins shall be designed with consideration of the 100-year storm volume. All drainage conveyance facilities shall be designed for a 10-year storm or greater.

2. Building permits or improvement plans for proposed projects shall not be approved until an approved Drainage Study is completed as part of the Tentative Map process. The Drainage Study shall confirm the design factors for the collection system, including any necessary over sizing and confirm the available capacity for stormwater retention currently available.

3. Where detention facilities are required they shall be designed to ensure that the peak post development flows are attenuated to the pre-development peak flow.

4. Construction of public storm drainage collection systems shall be required to the satisfaction of the City of Ceres.

5. Interim facilities shall be designed in consultation with the City of Ceres.

6. Development projects shall participate in the cost of constructing master infrastructure facilities. Determination of fair share costs, timing and funding mechanisms for master infrastructure facilities are discussed in the Financing Plan (Chapter 10).

7. All proposed Office, Industrial and/or Commercial properties shall contain all storm drainage on-site unless regional improvements have been constructed to accept those flows and direct them to a proposed drainage retention basin.

8.4 WATER

The City of Ceres Public Works Department will be responsible for the operation and maintenance of the proposed water supply, transmission and distribution systems that will be developed within the within the WLSP. The proposed facilities consist of groundwater wells, transmission and distribution mains, and storage tanks. The potable water system shall be designed to be consistent with existing General Plan policies and City of Ceres standards and specifications, which are in effect at time of construction. It is intended that all newly developed properties in the WLSP will be served by the City of Ceres water facilities.

8.4.1 Existing Conditions

The Plan Area currently has limited public water service. The existing infrastructure consists of groundwater wells that provide water service to the private residences as well as a City of Modesto well site (APN 086-015.011) that provides service to portions of the existing commercial / industrial on the east side of Crows Landing Road. A City of Ceres well site (Hackett Well), located north of West Hackett Road and east of Crow Landing Road, provides flow to the existing City of Ceres service area east of Union Pacific Rail Road. This existing flow from the Hackett Well is assumed to be dedicated to the existing City of Ceres system. The Hackett Well is connected to the City of Ceres system via a 10-inch water main in Hackett Road running east to the area east of Union Pacific Rail Road. With the majority of the Plan Area consisting of existing rural residential properties and private wells serving individual properties, all private well systems will need to be abandoned per local and state requirements once those properties connect to the city's water system, unless incorporated into the City's non-potable

water system. Existing private wells on larger parcels may be considered by the City for utilization for non-potable landscape use, if preventive measures per State and local requirements are met.

8.4.2 Potable Water System Overview

The following provides a brief summary of the approach for providing potable water service to the Plan Area, the proposed ultimate water supply infrastructure and the ultimate transmission system.

8.4.2.1 Potable Water Demand Projections

The Plan Area consists of approximately 960 acres consisting of land uses of low density residential, high density residential, commercial, industrial, and schools and parks. Utilizing unit water demands as presented in the City of Ceres Water System Hydraulic Model Update, a preliminary average demand of 1,879 acre feet per year (ac-ft/yr) is calculated. This demand correlates to an average daily demand of 1,165 gallons per minute. Using a maximum day and peak hour peaking factor of 1.8 and 2.75 respectively, the maximum day demand is estimate at 3,382 ac –ft/yr (2,097 gpm) and peak hour demand is estimated at 5,168 ac-ft/yr (3,204 gpm).

8.4.2.2 Water Supply

The Plan Area plans to provide water supply via the same strategy used by the City at this time. Groundwater well(s) are proposed to be drilled and dedicated to the City upon approval. Upon approval by the City, the City will be the ultimate operator and owner of these facilities. With the preliminary calculated Plan Area potable water demand, 4 wells (3 plus 1 redundant) are required to be constructed. The assumptions for the groundwater supply serving the Plan Area are as follows:

- Wells are to provide supply up to maximum day demand of approximately 2100 gpm within the Plan Area. Well Sites will be required to be a minimum of one (1) acre in size.
- All wells are assumed to operate continuously to meet maximum day demand period.
- Groundwater wells are estimated to yield 700 gpm each. If wells produce additional yield, the number of wells may be reduced at the discretion of the City Engineer and/or Public Works Director.

- Water supply demand greater than the maximum day demand will be supplemented with water supplied by above ground storage tank(s), or the addition of a well to provide a supply up to 3000 gpm.
- Water supply treatment is to consist of well head treatment for the proposed onsite wells, if needed.

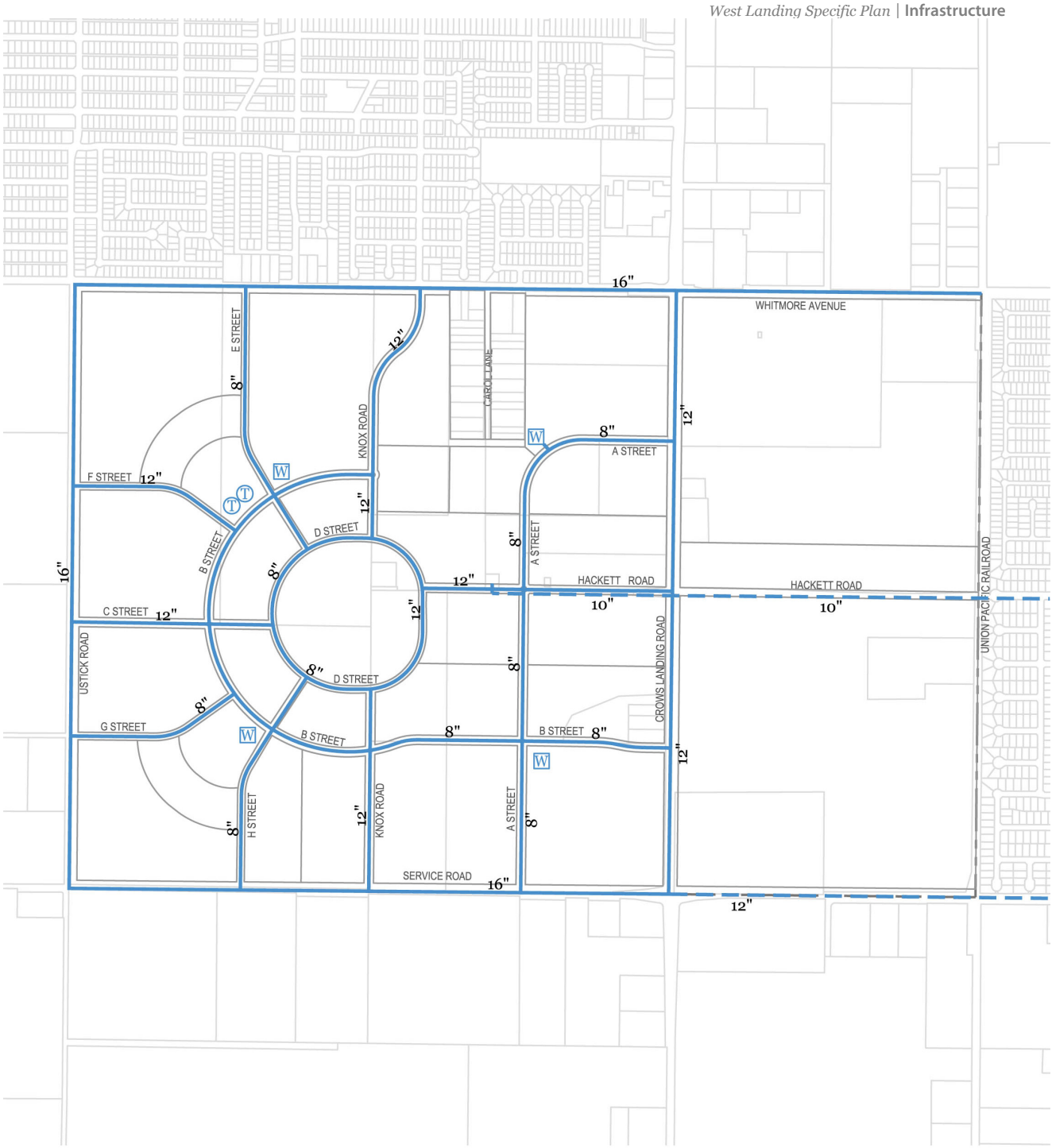
8.4.2.3 Storage Tank(s)

In order to provide storage for the necessary water supply (peak domestic/fire flow), the West Landing Specific Plan (WLSP) area will be responsible to provide 4.2 million gallons (mg) of storage onsite or combination on and offsite, as approved by the City Engineer. Two water storage tanks, 2.1 mg each, are anticipated to be used to meet peak and fire flow demands. The preliminary locations of the reservoir(s) are shown on Figure 8.3. The reservoir sizing calculation is based on general industry standards. The Plan Area must have sufficient storage capacity to provide the following volumes based on the peak or fire flow demands. These calculations have been performed for the Plan Area only and do not consider providing additional storage for future planning areas or for the existing City. Following is general assumptions and calculations for the storage tank sizing:

- Groundwater wells are assumed to be operating during water demand periods greater than maximum day demands (wells will yield a supply of approximately 2,100 gallons per minute).
- Pump station(s) located at the storage tank(s) sites will pump water from tanks at the flow rate that is greater than the maximum day demand.
- Storage tank(s) shall consist of approximately 4.2 million gallons.
    a) Fire Flow (5,000 gpm x 4 hours) = 1,200,000 gallons
    (Largest fire flow demand for a period of 4 hours)
    b) Operational (2.097 gpm x 24 hours) = 3,019,700 gallons
    (Max Day Demand for a period of one day)

8.4.2.4 Transmission Main Layout

Transmission mains proposed within the Plan Area are 12-inch mains and larger. The transmission mains proposed will be located within existing and proposed road right-of-way. Figure 8.3 outlines the preliminary alignments of transmission mains, as well as, proposed groundwater well locations and tank site(s). Within the individual subdivisions and commercial areas, there will be a network of distribution mains sized consistently with the latest edition of the City of Ceres Improvement Standards. The final configuration and sizing of these lines will be determined with the submittal of subsequent development applications and engineering improvement plans. The size and location of these additional lines will be determined by a qualified engineer during the future entitlements phase and will be subject to review and approval from the City of Ceres Department of Public Works.



Legend

- Water T-Main
- Existing Water T-Main
- W — Possible Well Locations
- T — Possible Tank Location
- Boundary

Figure 8.3: Backbone Water			Date: January 2011
West Landing Specific Plan Ceres, California	NOT TO SCALE	N	WOOD RODGERS DEVELOPING INNOVATIVE DESIGN SOLUTIONS

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8.4.3 Water Service Standards and Guidelines

The City of Ceres requires new residential subdivisions (2-acre lot size, or higher densities) as well as commercial and industrial properties to be served by a public water system. The design of this system shall operate to meet all the criteria established by City of Ceres. This criterion includes the following:

- Minimal residual system pressure to be greater than 40 pounds per square inch for maximum day and peak hour demands.
- Fire flows must be provided with a minimum residual pressure of 20 psi or greater under maximum day scenario.
- Maximum transmission main velocity shall not exceed 5 feet per second (Max Day Demand) and 7 feet per second (Peak Hour Demand).

8.5 RECYCLED WATER

A recycled water system has been included as a component of the water supply and water management strategy. At the time of plan preparation, the City of Ceres does not currently implement a recycled water system in or near the Plan Area. The City of Ceres at this time does not discharge treated wastewater into a waterway, therefore full secondary or tertiary treatment is not currently being applied. Ultimately when a treated water source becomes available, the recycled system would extend west on Service Road to the WLSP area and routed via transmission lines and booster pumps (see Figure 8.4) to provide irrigation water for landscaped and open space areas. Such conjunctive use and conservation strategies will provide for reliable and sustainable supplies.

The object is to make recycled water available for the irrigation of active recreational areas and landscaped corridors. Lateral lines are proposed to the community park site each of the neighborhood park sites (See Figure 8.4). The final alignment and sizing of these laterals will be determined upon the submittal of more detailed development applications and engineering improvement plans.

The use of recycled water for irrigation of landscape areas is dependent upon a number of factors including the cost of this water in comparison to potable water supplies, the availability of a consistent supply, and the requirement of its use by local agencies. To offset the additional cost of installing irrigation systems to meet the state mandated recycled water requirements, the cost of recycled water is typically priced less than potable supplies, thereby encouraging its use.

In the interim it is anticipated that agricultural wells will be utilized as a supply source for the Parks as well as large landscape corridors and medians. Consideration will need to be given to the location and placement of these facilities in order to avoid conflict with future facilities. All supply wells shall be designed per local and state regulations and will be subject to review and approval from the City of Ceres Department of Public Works.

8.5.1 Recycled Water Standards and Guidelines

Irrigation systems for major landscape corridors adjacent to arterial roads, medians and parks, should consider the use of recycled water or allow for the conversion to recycled water once it becomes available. However the designers will need to recognize that small landscaped areas are not cost effective for the extension of recycled water. All non-potable irrigation piping designated for landscape use shall be constructed with purple pipe or as approved by the City of Ceres.

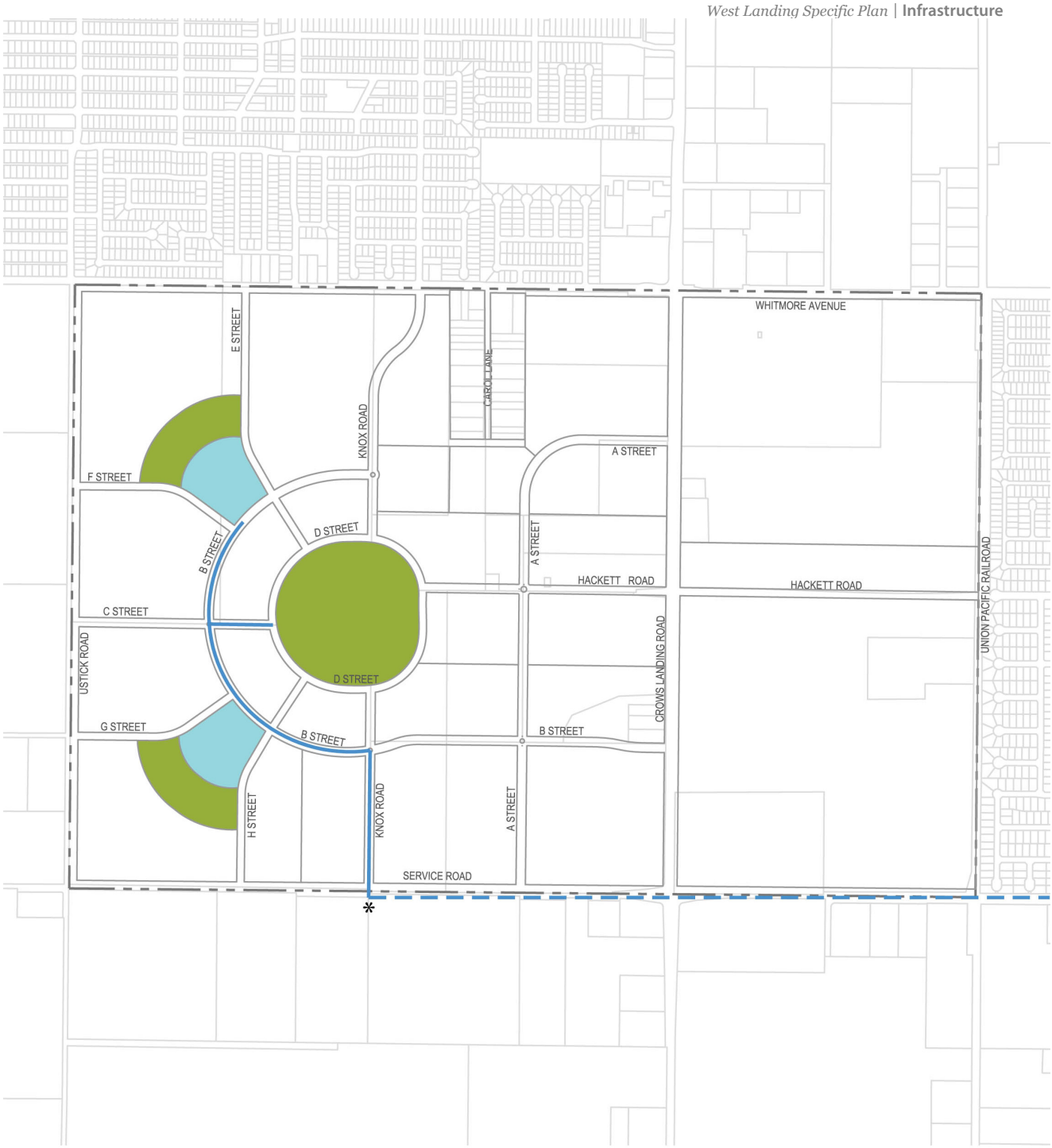
8.6 DRY UTILITIES

The following section describes the existing public or "dry" utilities in the vicinity of the Plan Area, including electricity, natural gas, and telecommunications (i.e. telephone and cable), and lists guidelines and standards. Each of the utility service providers listed has indicated that adequate infrastructure exists or can be readily extended to serve the WLSP.

Utility	**Providers**
Electric Service	Turlock Irrigation District
Natural Gas	Pacific Gas and Electricity
Communications	AT&T
Cable	Charter Communications

8.6.1 Electrical Power

Turlock Irrigation District (TID) currently operates the power supply in the Plan Area. These lines will provide electricity service to the Plan Area. Additional lines will be installed by TID as demand requires.



Legend

- Reclaimed Water Main (RCW)
- Future Reclaimed Water Main (RCW)*
- P — Parks
- ES — Schools
- Boundary

*Future connection to City of Ceres reclaimed water system.

Figure 8.4: Recycled Water | Date: January 2011

West Landing Specific Plan
Ceres, California

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WOOD RODGERS
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8.6.2 Natural Gas

Natural gas is available from PG&E in the Plan Area and extension of facilities may be initiated upon completion and execution of line extension agreements. However, the appropriate land use plans, zoning, and phasing exhibits must be submitted to PG&E in order for PG&E to obtain the expected loading requirements and initiate the planning and design process.

8.6.3 Telecommunications

AT&T of California has existing overhead and underground telephone service in or near the Plan Area. Additional lines and or extensions will be installed by AT&T as demand requires.

8.6.4 Dry Utility Guidelines and Standards

1. Tentative Subdivision Maps and Development Plans shall be submitted by the City of Ceres to the appropriate utilities to confirm the location and availability of service.
2. Builders shall coordinate with utility providers regarding precise design requirements upon the preparation of improvement plans.
3. Telecommunication services shall be provided to every home within the Plan Area, enhancing the opportunity for tele-commuting and home occupations, and thereby reducing the impacts on the transportation system and air quality.
4. All new electrical and telecommunication services, excluding primary transmission lines 69 KV or larger and substations, shall be installed underground.
5. Under grounding of existing overhead facilities will be required to the extent practical and as required by the City of Ceres.
6. The service standards for utility providers (other than TID) are established and administered by the California Public Utilities Commission.