



## IMPROVEMENT DESIGN STANDARDS

This check list establishes uniform procedures for the design and the minimum requirements for the preparation of Improvement Plans in the City of San Marcos. It is intended as a guideline to uniformity and to provide the designer with sufficient information to prepare the desired plans with a minimum of uncertainty.

Completed	N/A	GENERAL REQUIREMENTS
		The project is located in the City of San Marcos and the limits of work are clearly identified
		Plans are prepared on the approved improvement plan border and title block. The City's required Border and Title Block information (AutoCAD v.14), with Improvement Notes, is available at no cost. For a copy, please provide us with either a blank floppy disk or your e-mail address.
		A location map is provided showing a measured distance from the Project Site to nearest intersection. Include scale and Thomas Guide page number and grid (e.g.: <i>TG pg. 1108, grid J7</i> ). Direct the north orientation of the map towards the top of sheet or include a north arrow.
		Property owner's contact information with signature line for endorsement by property owner.
		A statement referencing the source of the existing topography as shown on the plans shall be included on the title sheet.
		A statement referencing the source of the basis of bearing as shown on the plans shall be included on the title sheet.
		The Declaration of Responsible Charge and Geotechnical Engineer's Declarations are provided and signed.
		The grading consists of the following work to be done in accordance with the latest edition of the following documents: San Diego Area Regional Standard Drawings, Standard Specifications for Public Works Construction ("Green Book"), City of San Marcos Grading and Excavation Ordinance, State of California Department of Transportation (CalTrans) Standards Plans, State of California Department of Transportation (CalTrans) Standard Specifications, State of California Traffic Control Manual, Water District Standard Drawings and Specifications.
		Legal description for the affected property.
		The Hydrology/Hydraulic Report is referenced on the title sheet
		Listed or graphical sheet index is provided.
		City of San Marcos standard Improvement Notes are provided.
		Water District General Notes are provided as applicable.
		Name, address and telephone number of engineering firm preparing the plans.
		List of referenced as-built drawings used to depict existing conditions.



		Plans are prepared to an appropriate engineering scale (typically 10, 20, 30 or 40 scale horizontally).
		North arrow, scale and graphic bar scale. North shall always be oriented up or to the right on all plans.
		Centerline stationing increases from left to right. Equations are given for intersections and when matching existing improvements. The centerline station is provided on all property lines at the point where said property line intersects the street right-of-way
		MATCHLINE stationing is provided for both plan and profile views. Matchline shall also reference appropriate preceding and/or following sheets (e.g.: MATCHLINE STA. 106+50 - SEE SHEET 7). Matchline should be a fat and solid line
		Identify and dimension property including (also City limit line if applicable), centerline, right-of-way, easement lines, and assessor's parcel numbers of adjacent parcels.
		Standard line types and line weights shall be used (e.g. centerline is a line-dash-line; property lines are line-dash-dash-line; new curb, gutter, sidewalk and right-of-way lines are solid; storm drain lines are dashed).
		Specifically identify any existing facilities [e.g. existing fire hydrants, meters, poles, utility pedestals, overhead wires and/or underground conduits (electrical, telephone and cable television), vaults, water mains and laterals, sewer mains and laterals, valves, manholes, guardrails/barricades, street lights, driveway locations, curb and gutter, sidewalk, drainage inlets with channels and pipes, walls, fences, etc.] and whether the facility is "to remain," "to be relocated," or "to be removed."
		Show existing structures, trees, plants, shrubs, and contours on property and within 50 feet of property lines as dashed lines or screened background to clearly designate from proposed work.
		Designer shall acquire and reference as-built drawings from all local agencies (City, Vallecitos Water District, San Diego Gas & Electric, Pacific Bell, Cox Communications and/or Daniels Cablevision) to minimize conflict with existing facilities. POTHOLING shall be done as part of the design process as necessary to avoid conflicts.
		Specifically identify any proposed facilities (e.g. proposed fire hydrants, meters, water mains and laterals, sewer mains and laterals, valves, manholes, guardrails/barricades, street lights, driveway locations with widths, grades and types, curb and gutter, sidewalk, drainage inlets with channels and pipes, walls and fences with size and type, etc.).
		Show clearly how grading will affect areas at the lot lines. No off-site grading adjacent to lot lines is permitted unless a notarized letter of permission from adjacent property owner is on file at the City.
		Show the centerline station on all property lines at the point where said property line intersects the street right-of-way. Also show a spot elevation at said point based on the centerline elevation at the given station and the typical street section differential. Provide station equations at centerline intersections.
		The City of San Marcos Master Trails Plan has been reviewed and trail improvements and trail easements have been incorporated consistent with the plan.



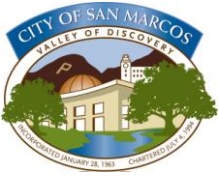
		Landscape and irrigation plans are included as part of the plan set and are in compliance with the City of San Marcos "Street Tree List and Planting/Irrigation/Hardscape Requirements" handout. Disturbed areas are shown to be revegetated in accordance with City standards. Landscaping sheets shall be incorporated into the improvement plans set and should cover all disturbed areas.
		Benchmark information is provided on the plans. The engineer-of-work shall confirm the proposed benchmark of the plan(s), is existing, is not disturbed, and will not be disturbed or destroyed by the proposed grading and/or improvements. A different benchmark shall be referenced if this is a possibility.
		Plans specifically identify all existing or proposed monuments within the vicinity of the project
		A 'M-10' survey monument shall be shown on all improvement plans for all centerline intersections, B.C.s. and E.C.s. Note: These monuments must be shown on a new tract or parcel map or Record of Survey associated with the improvements.
		<b>STREET DESIGN</b>
		Preliminary pavement sections are shown on the plans. The final pavement section will be based on R-value tests or minimum structural standards with the appropriate Traffic Index (TI) required by the City, whichever is greater. The "R" value test and recommended engineered structural section must be approved by the Public Works Director prior to the installation of base and paving materials.
		Asphalt overlay limits are identified on the plans in accordance with the City's "Backfill Requirements" handout.
		Traffic signing and striping notes are included on the first sheet of the traffic signing and striping plans if the Improvement plans include such plans (see "Traffic Signing & Striping" handout for appropriate notes).
		Traffic signal plans are in compliance with the latest version of the "City of San Marcos Manual for Traffic Signal Designs and Installation" handout (i.e. format, notes, etc.)
		All necessary data (bearing, length, delta, radius, arc, size and type of material, etc.) for street improvements (e.g. centerline, curb, gutter, water, sewer, storm drain, etc.) to be constructed based on these plans is shown on the improvement plan in a data table or adjacent to the improvement.
		Streets are designed to current City Standards as listed in the City's "Urban Street Design Criteria" handout. Standard criteria for street design subject to review include:  design speed, curb-to-curb distance, right-of-way width, minimum intersection spacing, minimum Traffic Index, minimum structural section, vertical curve "K" value, maximum skew at intersection, minimum horizontal radius, maximum super elevation, minimum "recovery" tangent, minimum intersection tangent, maximum and minimum grade, luminaire requirements at intersection and non-intersections, curb return radius, stopping sight distance, driveway access, driveway/intersection spacing, driveway to driveway separation, on-street parking, 2% from top of curb to right-of-way line



	<p>Street and Driveway profiles contain the following:</p> <p>If a straight grade, provide centerline and top of curb elevations at 100 foot intervals (minimum) and percent of grade;</p> <p>If a vertical curve, provide length, B.V.C., E.V.C., G1, G2, and PI station/elevation data for centerline and top of curb elevations at 25 foot intervals (minimum). Provide B.C. and E.C. stations and elevations (and offsets to top of curbs if not parallel or concentric to street centerline). Include low or high point station and elevation if applicable. See City's "Urban Street Design Criteria" handout. (Note: Stationing shall be based on the street centerline with either perpendicular or radial offset references).</p> <p>The radius of the curb return shall be governed by the more highly classified street at the intersection (i.e. if a residential street intersects a prime arterial, the curb return radius will be 35' because the prime arterial has a higher classification). Also, the street right-of-way (typically 10' behind the curb) at the curb return shall follow the chord from right-of-way return to right-of-way return (not concentric to the return).</p>
	<p>Typical cross sections of all streets are provided and show the following:</p> <p>Toe of 2:1 cut or top of 2:1 fill slope shall begin at the property or easement line (right-of-way) and "daylight" on site</p> <p>-2% slope between property (right-of-way) or easement line and top of curb</p> <p>5.0' wide concrete sidewalk per San Diego Area Regional Standard Drawing (SDARSD) G-7. The concrete sidewalk shall be supported by Class 2 aggregate base if the expansion index of the soil is greater than 20.</p> <p>Type 'G' curb &amp; gutter per SDARSD G-2 (supported by Class 2 aggregate base)</p> <p>Type B-3 median curb per SDARSD G-6 (for divided arterial streets) with an additional 0.5' of street structural section shown behind the back face of the median curb</p>
	<p>Curb ramps are proposed at all curb returns per Title 24, Part 2, State Chapter 71, Site Development Requirements for Handicapped Accessibility, Section 7103, Curb Ramps, of the California Building Code.</p>
	<p>A detail drawing of a raised median curb left turn pocket transition is provided. The detail shall be based on the 120' City of San Marcos standard median taper detail for a 10' wide turning lane (transition shall be 180' long if the median is 24' wide and requires dual left turn lanes).</p>
	<p>A detail drawing of a raised median curb nose flare for intersections is provided. The detail shall be based on the 45' City of San Marcos standard median nose flare detail. The standard radius of the nose flare is 2.5'.</p>
	<p>Radius-type driveways (see City's Radius Type Driveway handout) are shown for new or replaced driveways in commercial/industrial areas.</p>
	<p style="text-align: center;"><b>DRAINAGE DESIGN</b></p>
	<p>Profile storm drain facilities (18" diameter and larger)</p>
	<p>Pipe slope (as percentage, minimum slope = 0.5%)</p>



	Pipe D-load (e.g. 2000-D or Class 4) Minimum standard for RCP is 1350-D.
	100 year quantity and volume of water ( $Q_{100} = \underline{\hspace{1cm}}$ and $V_{100} = \underline{\hspace{1cm}}$ )
	Unpressurized pipe capacity ( $Q_{cap} = \underline{\hspace{1cm}}$ )
	Hydraulic grade line (in profile)
	Existing grade at storm drain centerline (in profile)
	Finish grade at storm drain centerline (in profile)
	Location of adjacent surface and sub-surface improvements (e.g. water and sewer main, and lateral crossings, gas, electric, telephone and cable TV conduits)
	Strength classification and invert design alternative if a reinforced concrete box (RCB).
	Engineer-of-Work shall submit D-load design calculations for storm drain pipes which will have less than 2 feet or more than 40 feet of cover.
	Outside edge of proposed curb inlet (or wings) are at least 10' from any PCR or driveway wing (or other curb & gutter modification) so the 10" curb face at the curb inlet has sufficient length to transition back to a 6" curb face.
	$Q_{100}$ and $V_{100}$ are listed at discharge locations. Check for non-erosive velocities at point of discharge or provide adequate energy dissipater.
	Concrete cross gutters (10' wide or as specified per G-12 & G-13) at street crossings or along centerline (private access roads only). Cross gutters per G-12 shall include top of curb spot elevations for the curb return quarter deltas in the profile view and 3 flowline spot elevations at the contact joints of the cross gutter in the plan view.
	Details for any site specific (non-standard) structures (e.g. drain inlets, catch basins, clean-outs, outlet structures, headwalls, etc.) Structural calculations have been provided as needed.
	Underground storm drain systems shall have a surface flow "escape" route (in case of system failure) with "escape" flowline elevations lower than adjacent building pad elevations.
	Storm drain clean-outs shall not be designed in pavement areas.
	<b>GRADING DESIGN</b>
	Show typical drawing of berm or swale at top of slope with dimensions.
	Spot elevations and final grades are shown by contours with solid lines to clearly designate from existing conditions.
	Cut and fill ratios on proposed slopes are provided (2:1 Max). Note: The 2:1 slopes shall begin at the property or easement line (right-of-way) and "daylight" on site.
	Top of wall, Top of footing, and finished surface elevations at the bottom of all retaining walls is provided.



		Typical details are provided for all retaining walls, except SDARSD walls. Structural calculations are provided as needed.
		Erosion control, including rip-rap, interim slope protection, gravel bags or other erosion control measures are provided as necessary to control sediment and silt from the project.
		<b>UTILITY INFORMATION</b>
		All existing facilities are specifically identified [e.g. existing fire hydrants, meters, poles, utility pedestals, overhead wires and/or underground conduits (electrical, telephone and cable television), vaults, water mains and laterals, sewer mains and laterals, valves, manholes, guard rails/barricades, street lights, driveway locations, curb and gutter, sidewalk, drainage inlets with channels and pipes, walls, fences, etc.] and noted whether the facility is "to remain," "to be relocated," or "to be removed."
		As-built drawings from all local agencies have been reviewed (City, Vallecitos Water District, San Diego Gas & Electric, Pacific Bell, Cox Communications and/or Daniels Cablevision) to minimize conflict with existing facilities. POTHOLING shall be done as part of the design process as necessary to avoid conflicts.
		The plans show the limits of all new electrical, telephone and cable television utilities and those that will be relocated underground.
		Plan view shall show the offset distance utilities if not parallel/concentric to centerline
		Fire Hydrants are specified as follows:  Residential "single family detached dwellings" Jones 3700 or Clow 2050, one 4" and one 2 ½" outlets.  Multi-Residential, commercial & Industrial Jones 3775 or Clow 2065, two 4" and one 2 ½" outlets.
		Water District General Notes are provided.