CITY OF LONGMONT
SECTION 100 – GENERAL REQUIREMENTS
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100.00 PURPOSE

100.01 TITLE

These regulations, together with all future amendments, shall be known as the City of Longmont Public Improvement Design Standards and Construction Specifications, may be cited as such, and shall be referred to herein as the City Standards. Upon adoption of these City Standards by City Council, the previous manual is hereby repealed and replaced by these City Standards. Individual sections may be updated independently, in which case they will repeal and replace the relevant section. In these City Standards, any reference made in singular may be construed as plural.

100.02 JURISDICTION

These City Standards shall apply to all land within the incorporated boundaries of the City of Longmont, except in areas where the City's jurisdiction is superseded by Federal, State of Colorado, or other jurisdiction, but including those areas the City has identified as Municipal Service Areas that extend past the incorporated boundaries and within which the City currently provides, or intends to provide, utilities and urban services.

100.03 AUTHORITY

These City Standards have been adopted pursuant to the authority conferred within Article 4.9, Municipal Charter, City Code, and Chapter 15.07, City Code, and shall have the same force and effect as all other City ordinances.

100.04 PURPOSE

The purpose of the City Standards is to provide the minimum design criteria and technical specifications to be adhered to in the design and construction of public improvements and work in streets, rights-of-way, easements, floodplains, and properties located within the jurisdiction of the City of Longmont, Colorado. It is the intent of these City Standards to obtain high quality design and construction throughout the City, with the completed work complying with City Standards.

100.05 INTERPRETATION

In the interpretation and application of these standards, the following shall govern:

A. These provisions shall be regarded as the minimum requirements for the protection of public health, safety, comfort, convenience, prosperity, and welfare of the residents of the City of Longmont. While these provisions are minimum requirements, they do not preclude imposition of more restrictive standards by agreement or law.

B. Whenever the provisions of these City Standards are found to be inconsistent with any other regulations or code, the City Engineer shall determine the standard to apply.

C. Projects shall comply with all laws, regulations, codes, and ordinances applicable to the design, construction, and performance of the work, and anything related to such. Except where expressly required by applicable laws, regulations, codes, or ordinances, the City shall not be responsible for monitoring compliance with any law, regulation, code, or ordinance, but maintains the right to enforce such compliance as law.

100.06 ENFORCEMENT RESPONSIBILITY

It shall be the duty of the Director of Public Works ("City Engineer"), or assigned designee, to enforce the provisions of these City Standards.

100.07 AMENDMENTS AND REVISIONS

A. These City Standards may be amended as needed to ensure their purposes are met. Any technical modifications to these City Standards, including the standard details within each Section, information in the appendices, and the Approved Material Lists, shall be approved by the City Engineer, will be made annually, and published to the City of Longmont website in December of each year. Policy changes within these City Standards shall be approved by City Council following the recommendations of the City Engineer. Such policy changes that affect only one section of these Standards may be reviewed and approved by City Council individually as brought forward by the City Engineer or their designee.

B. Electronic copies of the currently adopted Standards shall be available to the public on the official City of Longmont website (www.longmontcolorado.gov). The electronic copy shall be the official version of the City Standards.

100.08 EXCEPTIONS

A. Any exceptions from, or modifications to, the City Standards shall be subject to review in accordance with Chapter 15.02, City Code.
   (1) Requests for exceptions shall be submitted to the City at the time of plan submittal. The request shall state the exception requested, the justification and supporting data for the exception, and the requested change to the City Standards for the specific project. The City will require that exceptions be signed and sealed by a registered Professional Engineer licensed to do work in the State of Colorado.
   (2) Variances to Street Design Standards located within Chapters 15.05 and 15.07, City Code, shall meet the requirements for either the Administrative Modification, Exceptions, or Variances Sections in Chapter 15.02, City Code, depending on project designation.
   (3) Exceptions to City Standards for Utility Trenching (City Standards Section 100), Transportation (City Standards Section 200), Storm Drainage (City Standards Section 300), Wastewater Collection (City Standards Section 400), Water Distribution (City Standards Section 500), Landscape and Irrigation (City Standards Section 600), and Longmont Power & Communications (City Standards Section 700), as outlined in these City Standards, shall be reviewed by the City Engineer in conjunction with the relevant city departments. Requests for exceptions shall demonstrate compliance through the following criteria for approval:
      a. Special circumstances or conditions exist that are outside of the control of the applicant and that limit the ability of the design to meet the relevant City Standards. Financial difficulties, loss of prospective profits, and previously approved exceptions in other developments shall not be considered special circumstances.
      b. The exception represents an alternative design that mitigates the special circumstances or conditions while meeting the intent of the City Standards.
      c. The exception shall not: be detrimental to the public interest or other property, conflict with Envision Longmont or any applicable provision of the City Code, or other applicable laws, rules, and regulations, or endanger public safety, health, or welfare.

B. All exceptions to City Standards shall be reviewed and acted on prior to the commencement of construction or alteration of the relevant improvement or part of the relevant improvement. Exceptions occurring as part of the Development Review Committee process shall be submitted in conjunction with design plans and prior to Final Approval. The submittal process shall include the Request for an Exception to City Standards form located in the Appendices of these City Standards.

C. Exceptions occurring during public improvement construction due to unforeseen site conditions or other changed conditions require the Contractor and / or Engineer of Record to submit the exception request in writing to the City Engineer. The City shall respond promptly and in writing to the exception request, but reserves a minimum of ten (10) business days for review and response. When additional review time is required, the City shall notify the Contractor and / or Engineer of Record of the need for additional time within five (5) business days of the submittal.

D. Approval of construction plans containing elements not in compliance with these City Standards, and for which an exception has not been specifically requested and approved, does not imply approval of an exception from these City Standards. Only those exception requests formally submitted in writing and approved by the City Engineer are granted.

101.00 ABBREVIATIONS AND DEFINITIONS

101.01 ABBREVIATIONS

For the purposes of these City Standards, the following abbreviations shall mean the following phrases, except where the context clearly indicates otherwise. For words, terms, and phrases used in these City Standards that are not abbreviated below, or elsewhere in the Longmont Municipal Code, the City Engineer shall interpret or define the abbreviations of such words, terms, and phrases.

AA – Aluminum Associates
ACP – Asbestos Cement Pipe
AASHTO – American Association of State Highway and Transportation Officials
ACI – American Concrete Institute
ADAAG – Americans with Disabilities Act Access Guidelines
ADT – Average Daily Traffic
ANSI – American National Standards Institute
ASCE – American Society of Civil Engineers
ASME – American Society of Mechanical Engineers
ASSE – American Society of Sanitary Engineers
ASTM – American Society for Testing and Materials
APWA – American Public Works Association
AWWA – American Water Works Association
CDPHE – Colorado Department of Public Health and Environment
CDPS – Colorado Discharge Permit System
CDOT – Colorado Department of Transportation
CLOMR – Conditional Letter of Map Revision
CLOMR-F – Conditional Letter of Map Revisions based on Fill
CP – Colorado Procedure
CPPA – Corrugated Plastic Pipe Association
CPTED – Crime Prevention Through Environmental Design
CPW – Colorado Parks and Wildlife
CUHP – Colorado Urban Hydrograph Procedure
DRC – Development Review Committee
DWR – Division of Water Resources
EPA – Environmental Protection Agency
ECS – Erosion Control Specialist
EOR – Engineer of Record
EURV – Excess Urban Runoff Volume
FEMA – Federal Emergency Management Agency
FHWA – Federal Highway Administration
FPP – Floodplain Development Permit
FIA – Floodplain Impact Analysis
HDPE – High Density Polyethylene Pipe
HI – Hydraulic Institute

IBC – International Building Codes
IFC – International Fire Code
IGA – Inter-governmental Agreement
IPC – International Plumbing Code
IRC – International Residential Code
ISO – Insurance Services Office or International Organization for Standardization
LABCAT – Laboratory for the Certification of Asphalt Technicians
LAPC – Longmont Area Comprehensive Plan
LDC – Land Development Code, Longmont Municipal Code Title 15
LID – Low Impact Development
LOMR – Letter of Map Revision
LOMR-F – Letter of Map Revision based on Fill
LPC – Longmont Power & Communications
LSDCM – City of Longmont Storm Drainage Criteria Manual
MGPEC – Metropolitan Governments Pavement Engineers Council
MHFD – Mile High Flood District
MS-2 – Asphalt Institute's "Mix Design Methods for Asphalt Concrete" manual
MS4 – Municipal Separate Storm Sewer System
MUTCD – Manual of Uniform Traffic Control Devices
NACTO – National Association of City Transportation Officials
NCSPA – National Corrugated Steel Pipe Association
NEC – National Electric Code
NEMA – National Electrical Manufacturers Association
NESC – National Electric Safety Code
NIST – National Institute of Standards and Technology
NPDES – National Pollutant Discharge Elimination System.
NSF – National Sanitation Foundation
OSHA – Occupational Safety Health Administration
PIA – Public Improvement Agreement
PPI – Plastic Pipe Institute
PROWAG – Public Rights-of-Way Accessibility Guidelines
PSC – Permanent Stormwater Control
PSCM – Permanent Stormwater Control Measure
PVC – Polyvinyl Chloride
RCP – Reinforced Concrete Pipe
RPZ – Reduced Pressure Zone
ROW – Right-of-Way
SCAP – Stormwater Construction Activities Permit
SWMP – Stormwater Management Plan
UDFCD – Urban Drainage and Flood Control District
UMC – Uniform Mechanical Code
UNCC – Utility Locates Center of Colorado
UPW – Utilities and Public Works

USACE – US Army Corps of Engineers
WEF – Water Environment Federation
WQCV – Water Quality Control Volume
WSE – Water Surface Elevation

101.02 DEFINITIONS

A. For the purposes of these City Standards, the following terms shall have the following definitions. For words, terms, and phrases used in these City Standards that are not defined below, or elsewhere in the Longmont Municipal Code, the City Engineer shall interpret or define such words, terms, and phrases.

B. Wherever the words "as directed," "as required," "as permitted," or words or phrases of similar meaning are used, it shall be understood that the direction, requirements, or permission of the City Engineer is intended. Similarly, the words "approved," "acceptable," and "satisfactory" shall refer to the approval of the City Engineer. References made to City Standards, methods of testing materials, codes, practices, and requirements are understood to be the latest revision of said references and shall govern unless a specific revision is stated.

APPLICANT – Any of the following parties that has submitted an application pursuant to Title 15, City Code:

A. The record owner(s) of the subject property or the owner of subsurface oil and gas or leasehold interest therein;
B. The city or other quasi-governmental entity;
C. The developer of the subject property;
D. A purchaser of the subject property under a sale;
E. The duly authorized agent of the owner(s).

APPROVED MATERIALS LIST – The latest revised list of materials approved for construction in the City of Longmont.
APPROVED PLAN – The latest revised construction plan approved by the City Engineer.
AREA UNDERDRAIN – Pipe installed to intercept or drain groundwater, but not located around the footing, foundation or basement of a building, dwelling, or structure.
BUILDING – Any structure utilized or intended for supporting or sheltering any use or occupancy.
BUILDING PERIMETER UNDERDRAIN – A pipe installed around a footing, foundation, or basement to drain groundwater away from a building, dwelling, or structure.
CAPITAL IMPROVEMENT PROJECT – A new, replacement of, or improvements to city infrastructure (buildings, roads, parks, water, and sewer lines, etc.) that has a minimum life expectancy of five years and a minimum cost of $10,000.
CITY – Shall mean the City of Longmont, a municipal corporation of the State of Colorado.
CITY CODE – Shall mean the official adopted City of Longmont Municipal Code.
CITY ENGINEER – Shall mean the Director of Public Works for the City of Longmont or designated representative.
CITY INSPECTOR – Shall mean an authorized representative of the City Engineer at the site of the work.

CITY STANDARDS – Shall refer to the City of Longmont Public Improvements Design Standards and Construction Specifications.
CLEAN WATER ACT – The federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.
CLEARING – Any activity that removes vegetative surface cover.
COLORADO DISCHARGE PERMIT SYSTEM (CDPS) – The Colorado program based on the National Pollutant Discharge Elimination System (NPDES) framework that is required by the Environmental Protection Agency (EPA) under the Clean Water Act amendments of 1987 to regulate municipal and industrial stormwater discharges. The Water Quality Control Division has stormwater regulations (5CCR 1002-61) in place that require specific types of industrial facilities that discharge stormwater associated with industrial activities, including construction activities disturbing over one (1) acre of land, to obtain a CDPS permit for such discharge.
COMMON AREAS – Privately-owned open areas within or related to a development that are designed and intended for the common use or enjoyment of the residents of the development and their guests and may include such complementary structures and improvements as are necessary and appropriate.
CONSTRUCTION ACTIVITY – Earth-disturbing activities, such as clearing, grading, excavation of land, demolition, and other related activities (e.g., stockpiling of fill materials; placement of raw materials at the site), installation of utilities, assembly and completion of streets, sidewalks, and buildings, and other activities of a similar nature.
CONSTRUCTION SITE – Any location where construction activity occurs.
CONTRACTOR – Shall mean a person, partnership, or corporation duly licensed and insured to perform work in the City of Longmont, Colorado.
CONTRACTOR'S REPRESENTATIVE – Shall mean the owner, superintendent, foreman, or any person designated by the Contractor to be responsible for construction in the field.
CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN - A system for developing the built environment to reduce the possibility of opportunistic crime and limit the perception of crime in a given neighborhood.
CUL-DE-SAC – A street open at one end only, with a radius bulb for the turning around of vehicular traffic on the other end.
CURB – A stone, concrete, or other improved boundary usually demarcating the edge of a street, parking lot, or other paved area.
CURB CUT – An opening along the curb line at which vehicles or pedestrians may enter or leave the street, parking lot, or other paved area.
CUSTOMER – Shall mean a property owner, resident, or member of the municipal service area that is afforded the use or the availability of utility services from the City of Longmont.
DESIGN ENGINEER / ENGINEER OF RECORD – Shall refer to the engineering firm or Professional Engineer responsible for the design, plans, specifications, and the field surveys of a specific project.
DESIGN PROFESSIONAL – Shall refer to the person or firm responsible for the design, plans, specifications, and field surveys of a specific project.
DEVELOPER – Shall mean any person, firm, partnership, joint venture, limited liability company, association, corporation, or other entity, who participates as owner, promoter, sales agent, or a similar role, in the planning, platting, development, promotion, sale, or lease of a subdivision or development.

DEVELOPMENT PROJECT – Any manmade change to improved or unimproved real estate, including but not limited to: the alteration, construction, reconstruction, conversion, or enlargement of any structure; any change in use of a property, building, or structure; and any mining, dredging, filling, grading, paving, excavating, or drilling operation. The term "development" shall include the act of subdivision, unless otherwise expressly excluded.
DEVELOPMENT CODE – Title 15, City Code, entitled "Land Development Code."
DEVELOPMENT REVIEW COMMITTEE (DRC) – A committee responsible for staff review of development applications. This committee consists of representatives from: the Planning and Development Services, Fire, Public Works, Parks and Natural Resources, and Longmont Power and Communications departments of the City, along with any other applicable departments.
DEVELOPMENT REVIEW PROCESS – Shall be as outlined in Chapter 15.02, City Code, latest version.
DISTURBED AREA – That area of the land's surface disturbed by any work or activity upon the property by means including but not limited to: grading; excavating; stockpiling soil, fill, or other materials; clearing; vegetation removal; removal or deposit of any rock, soil, or other materials; or other activities which expose soil. Disturbed area does not include the tillage of land that is zoned for agricultural use.
DRIVEWAY – An improved and maintained way providing vehicular access from the public street to a parking area, to dwellings, or other uses.
DRYLAND GRASS OR VEGETATION – Any live landscaping, including native grass and vegetation, but not including weeds, capable of growing in the local environment without supplementary watering once established.
EARTHWORK – The disturbance of soils on a site associated with clearing, grading, or excavation activities.
EASEMENT – An interest in real property that establishes the right of the easement holder to use the property for certain purposes, such as utilities installation, access, or maintenance. Fee ownership of the underlying land remains with the property owner, not the easement holder.
EROSION – The detachment and movement of soil or rock fragments by water, wind, ice, or gravity.
EROSION CONTROL – Measures that prevent erosion.
EROSION CONTROL SPECIALIST – An individual who has received training and is certified by an organization acceptable to the City Engineer to install, inspect, and maintain erosion and sediment control practices.
EXCEPTION – A deviation from the specific terms of the City Standards.
FINAL STABILIZATION – When all soil disturbing activities at the site have been completed and one of the following two conditions is met:

A. Uniform vegetative cover has been established with a density of at least seventy (70) percent of pre-disturbance levels. Establishment of a vegetative cover capable of providing erosion control equivalent to pre-existing conditions at the site is considered final stabilization; or
B. Equivalent permanent, physical erosion reduction methods have been employed.

FLOODPLAIN DEVELOPMENT PERMIT – A permit that is required before any construction or development can begin within any 100-year floodplain in the City, including the placement of manufactured homes proposed within flood-prone areas. Permits are required to ensure that proposed development projects meet the requirements of the NFIP and the City of Longmont floodplain regulations.

GOVERNING AGENCY – means the applicable governmental agency, including the City of Longmont, the Counties of Boulder or Weld, or the State of Colorado, with authority to inspect and approve construction activities.
GRADING – Rearrangement of the earth's surface by stripping, cutting, filling, or stockpiling of earth or land, including the land in its cut or filled condition, to create new contours or grades.
GRADING PERMIT – See Stormwater Construction Activity Permit.
ILLEGAL DISCHARGE – any discharge to the storm drainage system that is not composed entirely of stormwater or any release of pollutants that potentially discharges to the storm drain system.
INFILL – The development of a parcel of land adjacent to platted lots or developed parcels along at least two-thirds of its perimeter, and where water, sewer, electric, gas, and phone utilities and street access are adjacent to the parcel and other public services and facilities are available nearby.
INFILTRATION – Refers to extraneous flow (excluding sewage) which enters a sewer system: at pipe connections to manholes, through joints in manholes or pipe, at breaks in pipe or joints, or because of corrosion of pipe, poor construction, or ground movement.
INFLOW – Refers to the extraneous flow in sewer systems from sources other than infiltration, such as basement drains, roof drains, manhole covers, etc.
LANDSCAPE ARCHITECT – A registered landscape architect licensed with the State of Colorado, with expertise and qualifications in the areas covering the scope of work.
LANDSCAPE AREA – An area comprising of any combination of living plants, inorganic material such as rocks or stones, and architectural features, including but not limited to fountains, pools, art works, screen walls, fences, street furniture, and ornamental concrete or stonework.
LANDSCAPING – Preserving, rearranging, modifying, or increasing the number of trees, shrubs, grass, and decorative materials, such as fences or walls, on a lot, tract, or parcel of land.
LOCAL STREET SYSTEM – The interconnected network of local and collector streets that provides access to a residential development from an arterial street.
LOW IMPACT DEVELOPMENT (LID) – Systems and practices that use or mimic natural processes that result in infiltration, evapotranspiration, or use of stormwater in order to protect water quality and associated aquatic habitat. LIDs are a comprehensive land-use planning and engineering design approach to managing stormwater runoff with the goal of mimicking the pre-development hydrologic regime. It emphasizes conservation of natural features and use of engineered, on-site, small-scale hydrologic controls that infiltrate, filter, store, evaporate, and detain runoff close to its source. Reference Chapter 14.26, City Code.
MAJOR STRUCTURE – For the purposes of these City Standards, a “major structure” is defined as a bridge or culvert(s) with a total length greater than twenty (20) feet measured along the centerline of the roadway between the inside face of abutments, inside faces of the outermost walls of culverts, or spring lines of arches. Major Structures also include culverts with multiple pipes where the clear distance between the centerlines of the exterior pipes, plus the radius of each of the exterior pipes, is greater than twenty (20) feet.
MINOR STRUCTURE – For the purposes of these specifications, a “minor structure” is defined as a bridge, culvert, or a group of culverts that have a length greater than or equal to four (4) feet and less than or equal to twenty (20) feet measured along the centerline of the roadway between the inside face of abutments, inside faces of the outermost walls of culverts, or spring lines of arches.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) – A stormwater collection or conveyance system that is owned by a public entity that discharges to waters of the United States. To prevent harmful pollutants from being washed or dumped into MS4s, public entities are required to obtain NPDES permits and develop stormwater management programs (SWMPs) that include pollution prevention measures, treatment or removal techniques, monitoring, use of legal authority, and other appropriate measures to control the quality of stormwater discharged to the storm drains.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT – As authorized by the Clean Water Act (CWA), the NPDES Permit Program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or manmade ditches.

NATURAL AREA – Any of the following:

A. Streams, rivers, wetlands, and other bodies of water, including their associated riparian areas.
B. Areas characterized by significant stands of mature trees and vegetation.
C. Areas of topography characterized by steep slopes, erosion characteristics, geographic formations, high visibility from off-site locations, or the presence of rock outcroppings.
D. Any area identified as habitat, natural landmarks, or natural areas on the "Map of Wildlife and Plant Habitats, Natural Landmarks, and Natural Areas" included in Boulder County's Comprehensive Plan, as amended.
E. Any land that qualifies as a "wetland" under the Federal Clean Water Act, regardless of whether shown on any city or county map or inventory.
F. Other areas of a similar nature, as determined by the City Manager or designee.

OPERATOR – The individual who is responsible for day-to-day supervision and control of activities occurring at the Construction Site. The operator may be the Owner, Developer, Contractor, or an agent of one of these parties.

OWNER or PROPERTY OWNER – The owner or titleholder of any fee or possessory interest in property subject to the requirements of the development code, or any agent, representative, person, Developer, or entity duly authorized by the owner or titleholder to act on their behalf.

PARK – Land area owned by the City that is developed and maintained for active or passive recreational use and is open for the general public's use and enjoyment. A "park" may include, by way of example only: greenways, water features, picnic areas, natural areas, public playfields, public courts, and other recreation facilities.

PEDESTRIAN BRIDGE – A structure designed and constructed to provide means for pedestrian and light vehicle traffic to cross an obstacle such as a river, stream, ditch, road, railway, etc. The minimum span width over the obstacle shall measure at least five (5) feet.

PERMANENT STORMWATER CONTROL MEASURE – Long term techniques, processes, activities, structures, or treatment devices that, when used singly or in combination, prevent or reduce the pollutant content of a stormwater discharge.

PLANNER– Shall mean the City Planning and Development Services Director, or designated representative.

POLLUTANT – Any substance that is harmful to humans, animals, public health, the environment, or that can degrade the quality of receiving waters, cause the receiving waters to violate the stream standards established by the State of Colorado, or affect beneficial uses of water. The term includes, but is not limited to: sediment, dredged spoil, rock, sand, silt, incinerator residue or ash; solid waste; sewage;

wastes from industrial, commercial, domestic, or agricultural sources; trash, litter, garbage, or food waste; landscaping materials, lawn clippings, leaves, branches or other landscaping and yard debris; medical waste; wrecked or discarded equipment; radioactive materials; wastes that contain bacteria, viruses, and other pathogens that pose a threat to human health; pet wastes; heat, surfactants, soaps, and cleaning products, wastes, and residues from washing operations, including those that are biodegradable; oil and grease, petroleum hydrocarbons and antifreeze; metals; and toxic or hazardous wastes as defined by Federal, State, or Local laws and regulations, including biocides and pesticides.

POLLUTION – The presence in waters of the State of any substances, contaminants, or manmade or man-induced impairment of waters or alteration of the chemical, physical, biological, or radiological integrity of water in quantities or at levels which are, or may be, potentially harmful or injurious to human health or welfare, animal or plant life, or property or which unreasonably interfere with the enjoyment of life or property, including outdoor recreation, unless authorized by applicable law.

PRIMARY GREENWAY – A public right-of-way consisting of linear strips of land adjacent to creeks, rivers, ponds, lakes, reservoirs, ditches, or roadways used for stormwater drainage, passive and scenic open space and park purposes, and self-propelled transportation modes. Greenways provide connections between community and residential areas as described and designated by Envision Longmont.

PROFESSIONAL ENGINEER – A registered engineer licensed with the State of Colorado, with expertise and qualifications in the areas covering the scope of work.

PUBLIC IMPROVEMENT – Any facility that is within City rights-of-way, on City property, or otherwise maintained by the City after final acceptance including but not limited to: streets, alleys, sidewalks, primary greenways, parks, water and sewer lines, electric facilities, storm drainage facilities, arterial rights-of-way landscaping, and concrete trails.

PUBLIC IMPROVEMENT AGREEMENT (PIA) – An agreement executed by the City and an applicant during the Development Review Process guaranteeing the installation of, and participation in, specific public improvements. Financial security for the public improvements shall be submitted as required by Code. A Public Improvement Agreement is generally required before recording a Final Subdivision Plat or Final Plan.

RECORD DRAWING - A record drawing is the final, compiled drawing prepared by a design professional after construction is complete. These drawings demonstrate the on-site changes that the Contractor identified through field survey and red-line drawings. They are drawn and compiled as a ‘design professional approved’ set of on-site changes made specifically for the Owner.

RECEIVING WATER – Any water of the State of Colorado. These include any and all surface waters that are contained in, flow in, or flow through the State of Colorado. This definition includes all watercourses, even if they are usually dry, and irrigation ditches that receive municipal stormwater. It also includes storm sewer systems owned by other entities.

RIGHT(S)-OF-WAY – A strip of land for public purposes, including but not limited to: utilities, streets, pedestrian walkways, bicycle paths, and alleys.

RIPARIAN AREA – The land areas adjacent to a stream corridor, wetlands, or other body of water that contain vegetation, habitats, and ecosystems associated with bodies of water or dependent on the flow of water in the adjacent stream, wetlands, or other water body. A riparian area will vary in width depending on the particular stream, wetlands, or other body of water.

SANITARY SEWER – Refers to a sewer that carries wastewater from residential, industrial, and commercial facilities to the sewage treatment plant.

SECONDARY GREENWAY – Public rights-of-way consisting of an eight (8) foot wide pathway designed to provide open space connections between living areas, parks, schools, and primary greenways.
SEDIMENT – Soil (or mud) that has been disturbed or eroded and transported naturally by water, wind, or gravity, or mechanically by any person.
SERVICE CONNECTION – Privately-owned extensions from individual properties to the public electric, water, or wastewater facilities.
SIDEPATHS – Sidepaths are detached or attached paths that are a minimum of eight (8) feet wide to facilitate shared use by pedestrians and bicyclists.
SIDEWALK – Portion of a street between the curb line (or lateral line of the roadway) and the adjacent property line that are intended for pedestrian use.
SIGHT DISTANCE TRIANGLE – A triangular-shaped portion of land established at street intersections and street or driveway intersections in which nothing is erected, planted, or allowed to grow in such a manner as to limit or obstruct the sight distance of persons entering or leaving the intersections. Specifications for required sight distance triangles are found in Section 200 of these City Standards.
SITE PLAN – A specific development plan for a lot, use, or building specifying how the entire site will be developed. Final plans include, but are not limited to: building envelopes, uses, densities, open space, parking or circulation, access, drainage, building area, landscaping, and signs. Approval of a site plan means a proposed development complies with the standards and provisions of the Development Code and, consequently, the City may issue a building or grading permit to an applicant, assuming all other City Standards and regulations have been satisfied.
SLOPE – The ratio of horizontal distance (run) proportional to vertical distance (rise or drop) of a slope, such as a 4H:1V slope having a run of four (4) horizontal feet for every one (1) foot of rise.
STATE SPECIFICATIONS – Shall refer to the latest edition of the State Department of Transportation, Division of Highways, State of Colorado – Standard Specifications for Road and Bridge Construction.
STORMWATER – Any surface flow, runoff, and/or drainage consisting entirely of water resulting from any form of natural precipitation.
STORMWATER CONSTRUCTION ACTIVITY PERMIT (SCAP) – A permit allowing the discharge of stormwater from a construction site to the City's municipal MS4. This permit supports compliance with the MS4 permit and is required per Section 14.26, City Code.
STORMWATER CONTROL MEASURES (OR BMPS) – Any program, technology, process, siting criteria, operating method, measure, or device that controls, prevents, removes, or reduces pollution. Stormwater control measures include schedules of activities, prohibitions of practices, pollution prevention, educational practices, maintenance procedures and facilities, procedures, techniques, or practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters or stormwater conveyance systems. Stormwater control measures also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, wastewater or sludge disposal, or drainage from materials storage.
STORMWATER POLLUTION CONTROL PLAN – A set of plans prepared by or under the direction of a Professional Engineer that indicates the specific measures and sequencing to be used to control sediment and erosion on a development site during construction activity. Different types of stormwater pollution control plans include the State-required Stormwater Management Plan (SWMP) and the City-required Stormwater Pollution Control (SPC) Drawings submitted in support of the Stormwater Construction Activity Permit (SCAP).

STREAM OR RIVER CORRIDOR – The corridor defined by the ordinary high-water mark of a river or stream, plus associated riparian areas.
STREET – A public way dedicated for purposes of vehicular travel, including all area within rights-of-way. The street classifications for roadway design are as follows and as defined in the Multimodal Transportation Implementation Plan (MTIP):

A. Regional/Principal Arterials –These types of roads have the functional priority to provide mobility and access, as well as interconnectivity and continuity, within regions and metro areas. Principal arterials should be constructed with, or have the provision to include, four (4) or more through lanes. Principal arterials shall include bike lanes and bike paths.

B. Minor Arterials/Collectors – These types of roads have the functional priority to provide interconnections and continuity between or within neighborhoods. Minor arterials should be constructed with, or have the provision to include, two (2) to four (4) through lanes and one bi-directional center turn lane. They shall include eight (8) foot sidepaths and on-street bike lanes.

C. Local Streets – These types of roads have the functional priority to provide access and limited mobility. No continuity is required. They should be designed to include two (2) travel lanes, bicycle vehicle mixed traffic, parking lanes, and five (5) foot detached sidewalks.

TRANSPORTATION PLANNING – Focuses on the long-range planning issues for surface transportation in the City including pedestrian, bicycle, public transit, and future roadway planning. The primary guiding documents for transportation planning are listed below as part of Envision Longmont and the associated Multimodal Transportation Implementation Plan (MTIP) adopted together in 2016 and found on the City's website.

A. Arterial and Collector Street Master Plan – Envision Longmont Multimodal and Comprehensive Plan (2016) identifies planned Arterial and Collector streets.

B. Enhanced Multi-Use Corridor Plan – The Enhanced Multi-Use Corridor (EMUC) Plan identifies a set of corridors falling under this category and desirable design features. Developments within and or adjacent to the EMUC's route framework will be required to meet the Longmont Enhanced Multi-Use Corridor Plan and these City Standards.

C. Transportation Mobility Plan – The Longmont Transportation Mobility Plan (TMP) sets a vision for a connected, multimodal transportation system that meets Longmont's evolving needs.

TESTING AGENCY – Any individual, partnership, or corporation qualified and licensed to perform the required sampling, analysis, testing, and report-writing services.
TRAFFIC ENGINEER – Shall mean the Transportation Engineer or assigned designee with the Public Works Department.
TREATED WATER – Water processed by the City of Longmont Municipal Water Utility.
TREATMENT FACILITIES – Any plant, equipment, or other works used for the purpose of treating, separating, or stabilizing any substances found in water.
UNDERDRAIN COLLECTION SYSTEM – A privately-owned pipe system installed to collect the groundwater from building perimeter underdrains or area underdrains and carry the groundwater to a point of discharge on the surface, into a storm sewer, or into a drainage channel.

UNTREATED WATER – Water not processed by the City of Longmont Municipal Water Utility.
UTILITIES – Shall mean all infrastructure that provides services including but not limited to: water lines, sanitary sewer lines, drainage lines, electric lines, gas lines, and telecommunication lines.
WASTEWATER – Shall mean the water-carried and liquid wastes from dwellings, commercial buildings, institutions, and industrial facilities discharged to the Public Owned Treatment Works (POTW) and sewer system.
WATERCOURSE – A natural or artificial channel through which water can flow.
WATERS OF THE STATE OF COLORADO (WATERS OF THE STATE) – Refer to the Colorado Revised Statutes as amended.
WATERS OF THE UNITED STATES – Refer to the Clean Water Act and current definition from the Environmental Protection Agency.
VARIANCE – A deviation or exception from the specific terms of Title 15 of the Longmont Development Code.
VOLUME-TO-CAPACITY RATIO (V/C) – A measure of the operating capacity of a roadway or intersection in terms of the number of vehicles passing through divided by the number of vehicles that theoretically could pass through when the intersection or roadway is operating at its designed capacity. A V/C ratio of 1.0 means the roadway or intersection is operating at capacity; if the V/C ratio is less than 1.0, the traffic facility has additional capacity.
WELL – An oil-and-gas well or an injection well.
WELL SITE – The surface area of a proposed or existing well and its pumping systems.
WETLANDS – An area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

102.00 USE OF STANDARDS

102.01 GENERAL QUALIFICATIONS

A. The provisions of these City Standards apply to the construction, enlargement, alteration, removal, relocation, repair, trenching, restoration, and any other similar activity related to any public improvements, infrastructure, or common facilities regulated herein.

B. It is the intent of the City Standards to require a functionally complete project to be constructed in accordance with these City Standards. Any work, materials, or equipment that may reasonably be inferred as being required to produce the intended result shall be provided whether or not specifically called for. When words, that have a well-known technical or trade meaning in the development, construction, utility, and infrastructure realm are used to described work, materials, or equipment, such words shall be interpreted in accordance with that meaning. If there is confusion in the interpretation of a particular word or phrase, the City Engineer shall have the discretion to resolve the confusion.

102.02 USING THESE STANDARDS

A. These City Standards are to be used when designing and constructing all public improvements and infrastructure within the City and all City-owned public improvements and infrastructure outside of the City. For the purposes of these City Standards, public improvements and infrastructure includes, but are not limited to: streets, sidewalks, trails, sidepaths, curb and gutter, curb cuts, landscaping, water mains, fire hydrants, water services and meters, wastewater mains and services, manholes, stormwater mains, inlets, drainage swales and channels, and other improvements intended for public purposes or for the benefit of the community located within dedicated public rights-of-way and public easements.

B. These City Standards also provide design and construction requirements to be used when developing private lands that have an impact on public improvements, public rights-of-way, and/or public easements. The required private improvements associated with property development include, but are not limited to: landscape and irrigation standards per City Code, traffic mitigation, site access and driveway design, stormwater site drainage and detention facility improvements, water quality, and erosion control measures.

C. In addition, these City Standards provide design and construction requirements to be used when developing in the areas subject to flooding within the City's jurisdiction.

D. Reference to standard specifications, manuals, or codes of any technical society, organization, or association or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, laws, or regulations in effect at the time of City approval. However, no provision of any referenced standard specification, manual, or code shall be effective to change the duties and responsibilities of the City or any of their consultants, agents, or employees. Work shall be done in compliance with the approved plans and to the satisfaction of the City.

E. Changes to approved plans based on standard specifications, manuals, or codes of any technical society, organization, or association or to the laws or regulations of any governmental authority, whether references be specific or by implication, may be needed if a later revision of such standards will immediately affect public safety, health, or welfare.

102.03 PUBLIC IMPROVEMENT DESIGN

A. These City Standards prescribe minimum requirements and specifications for designing adequate and functional public improvements. However, the design of public improvements also depends on the land use zoning and comprehensive planning requirements for the City, as well as the specific site geography of the land to be improved or developed.

B. The City review for approval of submitted design plans for public improvements occurs as part of the Development Review Process which distributes design applications to staff in multiple departments, divisions, and agencies. The City development review staff has the primary responsibility for the review and approval of construction plans for public improvements.

102.04 DESIGN APPROVALS

A. An applicant seeking approval to construct public improvements in the City shall develop engineering designs and construction plans that comply with the design and construction standards provided in these City Standards. To comply with these City Standards, an applicant will need to file the necessary applications and meet the requirements of the City's land use regulations, permit standards, fee assessments, and other relevant City requirements.

B. An applicant seeking construction approval will need to consult floodplain mapping, local master plans, and locate existing public and private infrastructure to develop specific project designs.

C. In order to develop project designs that comply with these City Standards, an applicant for construction approval will need to enlist the services of a Design Professional which may include but is not limited to a Professional Engineer and a Professional Land Surveyor to meet the requirements for certifying acceptable designs for public improvements.

102.05 PROJECT RESPONSIBILITY

Plans shall be signed and sealed by a Design Professional where required by these City Standards, applicable laws and regulations, or as part of the DRC process. The Design Professional shall be responsible for all plans and specifications. Approval by the City Engineer shall in no way relieve the Design Professional of the responsibility for errors or omissions in design, plans, specifications, or field surveys. Any errors shall be corrected by the Design Professional to the satisfaction of the City Engineer at no cost or expense to the City. Where required, plans shall be signed and sealed by a registered Professional Engineer licensed in the State of Colorado. Landscape plans shall be stamped by a registered Landscape Architect licensed in the State of Colorado.

102.06 STANDARDS

A. Utility Trenching: The trenching standards prescribed in City Standards Section 100 under "Utility Trenching" outline the excavation and backfill process required for installation of utilities, pipelines, manholes, vaults, diversion structures and other appurtenances.

B. Transportation Improvements: The transportation standards prescribed in City Standards Section 200 "Transportation" provide for the study, design, and construction of site accesses, streets, sidepaths, sidewalks, bicycle facilities, and trails.

C. Storm Drainage Improvements: The stormwater standards prescribed in City Standards Section 100, "Utility Trenching", City Standards Section 300 "Storm Drainage", the Longmont Storm Drainage Criteria

Manual, and Mile High Flood District Volumes 1, 2, and 3 provide for the study, design, and construction of stormwater drainage and flood management improvements. Detention facilities, storm sewer and drainageway systems, water quality, and erosion control measures may be required as part of construction approval to mitigate the impacts of increased runoff resulting from land development.

D. Wastewater Collection: The utility standards prescribed in City Standards Section 100, "Utility Trenching" and City Standards Section 400 "Wastewater Collection Design" provide for the study, design, and construction of sanitary sewer collection facilities. These City Standards detail required forecasting for sizing wastewater collection mains, specific construction requirements for ensuring public health standards, and requirements for installing sanitary sewer service lines.

E. Water Distribution: The utility standards prescribed in City Standards Section 100, "Utility Trenching" and City Standards Section 500 "Water Distribution Design" provide for the study, design, and construction of water distribution facilities. These City Standards detail required forecasting for sizing water distribution mains, specific construction requirements for ensuring public health standards, and requirements for installing domestic water service lines.

F. Landscape and Irrigation: The standards prescribed in City Standards Section 200 "Transportation" and City Standards Section 600 "Landscape & Irrigation" provide for the selection, design, placement, and protection of trees, landscaping, and irrigation along all City owned and/or maintained areas including public street rights-of-way, primary and secondary greenways, park sites, and other areas as addressed in the City Code or identified in the landscape and irrigation plan notes and checklists of these City Standards.

G. Longmont Power & Communications: The power and communications standards prescribed in City Standards Section 700 "Longmont Power & Communications" provide for the selection, design, and placement of electric and broadband service utilities.

H. Urban Neighborhood Design Section: The Urban Neighborhood Design Section's standards prescribed in City Standards Section 800 "Urban Neighborhood Design Section" provide for the selection, design, and placement of infrastructure when the property meets the criteria outlined in Section 800.1 "Purpose".

103.00 PLAN REVIEW AND SUBMITTAL PROCESS

103.01 INTRODUCTION

A. The procedures outlined in the following sections are guidance for any design submittals requiring the construction of public improvements. All public improvements constructed within the City shall be designed in conformance with these City Standards. These standards and specifications apply to all improvements as stated Section 15.07.010, City Code.

B. The City's review and approval will only determine if the plans, specifications, and construction conform to the City's requirements. The City's approval shall be in writing. The City's review and approval will not relieve the Design Professional and Contractor from responsibility for any disparity from City requirements or adequate design standards. The City's review and approval shall not constitute any assumption on the City's part of responsibility or liability for the design or construction, or otherwise.

C. All plans, specifications, and calculations submitted to the City for review shall be prepared by, or under the direct supervision of a Professional Engineer duly registered and licensed to practice engineering in the State of Colorado. The Professional Engineer shall sign and certify all plans, specifications, and calculations and shall include the Professional Engineer's registration number and seal.

103.02 PLAN REVIEW

A. The City utilizes a Development Review Committee (DRC) to provide a coordinated and integrated Planning, Public Safety, and Engineering staff review of development submittals. The Engineering development review staff has the primary responsibility for the review and approval of construction plans for Development Projects.

B. These City Standards apply to submittals for Capital Improvement Projects, Annexations, Final Subdivision Plats, Site Plans, Public Improvements Plans (PIPs), Stormwater Pollution Control Plans, Permanent Stormwater Control Plans, and all other development applications listed in Chapter 15.02, City Code. Additional guidance on the land development processes and the associated application forms can be found on both the City website and Title 15, City Code.

C. The requirement for Public Improvement Plans (PIPs) depends on the complexity of the public improvements required for a site to develop. Approval of PIPs is required prior to the Final Subdivision Plat being recorded. Any development submittal that meets the requirements of Section 15.02.110, City Code, will require a Public Improvement Agreement (PIA). The PIA identifies public improvements that are required to be constructed, stipulates the timing of improvements, warranties, and provides the requisite assurance that the public improvements shall be constructed to these City Standards.

103.03 SUBMITTAL PROCEDURE & REQUIREMENTS

A. Submittal procedures shall conform to Titles 15 and 20, City Code, these City Standards, and other project specific requirements in accordance with the appropriate City Divisions or Departments.

B. Design submittals are required to be submitted as electronic files to the City for review, including but not limited to Annexations, Capital Improvement Projects, Engineering Design Submittals & Reports, Master Utility Plans, Final Subdivision Plats, Public Improvement Plans, and Final Site Plans. All drawings are to be spatially correct, to allow information to be transferred to the City's geographic information system (GIS).

C. The electronic drawing file(s) shall be in a (.dxf), (.dwg) or (.dgn) drawing format and a PDF format submitted to longmont.planning@longmontcolorado.gov or by other means acceptable to the City Engineer. The file shall be an overview of the entire project at a minimum.

103.04 CONSTRUCTION PLAN GENERAL PROVISIONS

A. All construction plans will be checked for conformance to the City Standards prior to acceptance and shall be submitted to the City for review via electronic submission. All sheets shall be drawn to scale including plan sheets, profile sheets, and detail sheets. The only exceptions allowed will be for City Standard details; however, they shall be placed on the drawings without modification.

B. Checklists that outline design requirements are provided in appendices to assist in the preparation of construction plans to be submitted to the City for review, including but not limited to ALTA Surveys, Public Improvements Plans (PIPs), Stormwater Pollution Control Plans, Permanent Stormwater Control Plans, Floodplain Impact Analysis, FEMA submittals, and Record Drawings. The checklists shall be considered the minimum information required for plan preparation; however, the City Engineer may waive some of the requirements outlined in the checklist based on the complexity of the project. Construction plans shall include all the necessary information required for the construction of all public improvements.

103.05 SURVEY REQUIREMENTS

A. Construction plans shall be designed in such a manner that conforms to the City's geographic coordinate system. Plans shall state whether coordinates are measured from the surface of the earth (ground measurements) or are based on the spatial data's coordinate system (grid measurements) and provide a scaling factor for conversion. Street center lines, property lines, and all other infrastructure shall utilize the City's geographic coordinate system for all aspects of the design.

B. All Land Survey Plats and Improvement Survey Plats submitted for project applications shall comply with the Colorado Revised Statutes and the Bylaws and Rules of the State Board of Licensure for Architects, Professional Engineers, and Professional Land Surveyors. Upon submittal of an Annexation Map, Preliminary Subdivision Plat, and/or Final Subdivision Plat, the Professional Land Surveyor shall include a location and a written description of coordinate values for monumentation on the Plat. At least two control points shall be labeled on the Plat using the state plane coordinate values. The two control points shall be section corners or 1/4 section corners.

C. The primary and secondary control points and other GIS land points, which may be used as initial starting values, are provided free through the Boulder County website. However, the information being provided by Boulder County does include a disclaimer, and as such Boulder County accepts no liability for the accuracy of data points. Please note that the GIS land points cannot be used for determining legal boundaries. The primary and secondary control point data can be found at the Boulder County Government website.

D. All topographic mapping, including contours and construction drawings, shall be based on the NAVD 1988 vertical survey datum (replaces NGVD 1929). The City shall neither accept any other datum nor shall an adjustment from some other datum to NAVD 88 be acceptable. Contours are required to be shown on plans a minimum fifty (50) feet beyond the project construction extents to adequately depict off-site drainage basins. Survey for floodplain modeling and mapping shall be a minimum of one hundred (100) feet beyond the property boundaries to adequately tie into existing mapping and to define off-site impacts.

E. The basis of bearing of the proposed development shall be in the Colorado State Plane Coordinate System, based on the 1992 HARN adjustment of the 1982 North American Datum (HPGN NAD 83/92).

F. Units of measurement shall be defined in U.S. Survey foot.

G. A Closure Report shall be submitted to the City with any Plat or easement drawing.

103.06 UTILITY LOCATION REQUIREMENTS FOR DESIGN

A. Architects, engineers, or other persons designing excavation shall follow the requirements of C.R.S. § 9-1.5-101 et seq. (referred to herein as the "Underground Utility Location Law"), except as more specifically identified herein.

B. Projects that meet all of the following criteria (subsurface utility engineering-required projects) are required to meet a minimum Quality Level B for design utility locations as identified in the subsurface utility engineering (SUE) standard ASCE 38:
   (1) Project involves a construction contract with a public entity;
   (2) Project involves primarily horizontal construction and does not involve the construction of buildings;
   (3) The Project:
      a. Has an anticipated excavation footprint that exceeds two (2) feet in depth and is a contiguous 1000 square feet (excluding fencing and signing projects); OR
      b. Involves utility boring.
   (4) The project requires the design services of a licensed professional engineer.

C. For all projects that fall under SUE, the following requirements shall be initiated as part of the project design:
   (1) A thorough subsurface utility engineering investigation that takes the results of comprehensive geophysical searches for known and unknown utilities and integrates the results of the geophysics with existing records and physical evidence in a risk-based depiction;
   (2) Test holes where needed for utility locations;
   (3) Utility location data that is transmitted to the Design Engineer in order to make informed design decisions and the Quality Level of each utility is marked on the plan set; and
   (4) All of the utility investigation shall take place under the direct responsible charge of a licensed Professional Engineer with training and a working knowledge of surface geophysics, engineering surveying, utility construction and design principles, utility conflict identification resolution, and utility risks as they pertain to the project.

D. The City Engineer may determine the same level of underground investigation is required even if all criteria listed above are not met, dependent on the existing site conditions. Please reference Section 109 "Utility Trenching" of these City Standards for specific information regarding utility installation requirements.

103.07 ENGINEERING DESIGN SUBMITTALS

(1) All engineering design submittals including reports and comprehensive plans shall include on the title page:
   a. The type of document (conceptual, preliminary, or final);
   b. The project name;
   c. The preparer's name, date, and firm

(2) All engineering design submittals including reports and comprehensive plans shall include on the title page:
   a. The type of document (conceptual, preliminary, or final);
   b. The project name;
   c. The preparer's name, date, and firm
   d. P.E. seal of preparer.

(3) The City Engineer may require one or all of the design reports listed in this section, depending on the circumstances of the project. These documents shall be submitted with initial submittal for review.

(4) All final reports shall be submitted as electronic documents.

(5) Reports shall be prepared (or supervised), signed, and stamped by a Professional Engineer and shall contain a certification sheet with the report statement and appropriate signatures per the requirements for each type of report located in the Appendices.

(6) Unless otherwise approved by the City Engineer, the report shall be dated within one (1) year of the plan submittal date.

A. DRAINAGE REPORT

(1) A drainage report shall be submitted to the City for review and approval prior to construction on any project or development. The drainage report shall comply with the requirements outlined in the Longmont Storm Drainage Criteria Manual and the City Standards Section 300 "Storm Sewer" and shall follow the Drainage Report Checklist included in the Appendices. All applicable elements in the checklist for each report shall be included or the study may be deemed incomplete prior to review.

(2) There are four levels of drainage reports that may be required during the review process, depending on the size and complexity of the project: drainage letter or technical memorandum, conceptual drainage report, preliminary drainage report, and/or a final drainage report. The level of report shall be determined by the City Engineer prior to the initial project submittal.

(3) The drainage report shall be a stand-alone document. When references are made to, or assumptions based on, previously submitted studies or reports, the drainage report shall include the appropriate excerpts, pages, tables, and maps containing the referenced information. Assumptions made in previous reports shall be verified and substantiated with each new report.

B. GEOTECHNICAL (SOILS) ENGINEERING REPORT

A geotechnical report shall be submitted to the City for review and approval prior to construction related to the installation of any public improvements. The geotechnical material design specifications shall comply with the requirements outlined in the City Standards Section 200 "Transportation". A checklist is provided in the Appendices to assist in the preparation of the report to be submitted to the City for review.

C. PAVEMENT REPORT

A pavement report shall be submitted to the City for review and approval for all proposed pavement within public rights-of-way or easements. The pavement design shall comply with the requirements outlined in City Standards Section 200 "Transportation". A checklist is provided in the Appendices to assist in the preparation of the report to be submitted to the City for review.

D. LONGMONT POWER & COMMUNICATIONS PROJECT INFORMATION

A PDF of an electrical one-line diagram, a CAD file including the site, utilities, landscape, and irrigation that identifies transformer locations, and an Electric Service Request Form shall be provided with the initial submittal of construction documents to the City for review by Longmont Power &

Communications. The submittal will initiate the electric utility design by Longmont Power & Communications. Further information on LPC submittal requirements can be found in the Appendices as well as City Standards Section 700 "Longmont Power & Communications".

E. TRANSPORTATION IMPACT STUDY

Transportation Impact Studies are required in order to adequately assess the impacts of a development proposal on the existing and/or planned street systems. Unless waived by the City, a written Transportation Impact Study signed and sealed by the responsible Professional Engineer shall be required for all development proposals when trip generation is expected to exceed fifty (50) vehicles during the peak hour or five hundred (500) Average Daily Traffic (ADT) based on the traffic generation estimates of the current Institute of Transportation Engineers Trip Generation manual or in the case where a localized safety or capacity deficiency exists, as determined by the City Engineer. The Transportation Impact Study shall include at a minimum the proposed land use, trip distribution, traffic project years, intersections requiring analysis, signal timing assumptions, and background traffic assumptions and may require additional information, as determined by the City Engineer. The Transportation Impact Study shall comply with the checklist included in the Appendices.

F. WATER AND WASTEWATER PROJECT INFORMATION REPORT

On commercial, industrial, or mixed-use developments over five (5) acres, residential developments over fifty (50) acres, or areas of limited capacity, the City Engineer may request a project information report be submitted with the preliminary construction plans to analyze the ability to provide water and wastewater services to the proposed site. A checklist is provided in the Appendices to assist in the preparation of the report to be submitted to the City for review.

G. UNDERDRAIN REPORT

An underdrain report will be required for all projects or developments where an underdrain collection system or area underdrain is required to be installed per the recommendations made in the geotechnical engineering report. The purpose of the underdrain report is to identify and define solutions to groundwater problems on the site. The underdrain report shall be submitted to the City for review and approval prior to any construction on the project or development. The underdrain report shall comply with the requirements outlined in City Standards Section 303 Underdrains and the Underdrain Report Checklist in the Appendices.

H. FLOODPLAIN IMPACT ANALYSIS REPORT

A floodplain impact analysis (FIA) report shall be required for projects proposed in any 100-year floodplain within the City's jurisdiction, unless it is a utility boring project that will not impact the floodplain. The FIA shall describe the changes to the floodplain from the proposed project, including filling in a floodplain with no mapped or defined floodway. The FIA report shall be submitted to the City for review and approval prior to approval of the Floodplain Development Permit. The FIA report shall comply with the requirements outlined in City Standards Section 301 Flood Risk Management and the FIA Report Checklist in the Appendices.

103.08 EASEMENTS AND RIGHTS-OF-WAY REQUIREMENTS

The following requirements apply to all sections of these standards.

A. Public utilities are required to be located in public rights-of-way or designated easements. Public utility mains shall be aligned in public rights-of-way per the alignment descriptions for City Standards Sections

300, 400, and 500 for storm sewer, sanitary sewer, and water distribution systems respectively. Reference Detail 100-01 “Placement of Utility Mains within Public ROW”.

B. Easement requirements for one public utility main shall include a minimum width of thirty (30) feet with a twenty (20) foot wide City of Longmont utility easement at the center and five (5) foot wide general utility or LPC easements on either side. Easement requirements for two public utility mains shall include a minimum width of thirty (30) feet with minimum five (5) feet of separation from the outside of each pipe to the easement boundary, ten (10) feet from the outside of each pipe to the outside of the adjacent pipe, and five (5) feet wide general utility or LPC easements on either side of the thirty (30) foot wide easement. Easement requirements for three public utilities shall include a minimum width of forty (40) feet with ten (10) feet of separation from the outside of each pipe to the easement boundary and from the outside of each pipe to the outside of the adjacent pipes. Reference Detail 100-02 “Public Utility Easements on Private Property”.

C. Longmont Power & Communications easement information can be found in City Standards Section 700 “Longmont Power & Communications”.

D. Maintenance and Access easements may be required in areas where the public sidewalks or sidepaths are adjacent to the edge of the right-of-way to allow for future repair and/or replacement.

E. Easements granted by means of a separate easement agreement shall be governed by the terms of that agreement.

F. Easements dedicated to the City by means of Final Subdivision Plat, according to Section 15.02, City Code, shall be governed by the general Plat Notes as found in Appendix B-1.

103.09 UTILITY LINE SEPARATION AND CROSSINGS

A. HORIZONTAL SEPARATION

Unless otherwise approved by the City Engineer, the following minimum separation or clearance requirements shall apply for all public and private improvements.

(1) A minimum of ten (10) feet separation is required from edge of pipe to edge of pipe for all existing or proposed water mains, sanitary sewer mains, and storm sewer mains. This may be increased due to the depth and size of existing and proposed utilities.

(2) All water mains, sanitary sewer mains, water service lines and sanitary sewer service laterals shall have a minimum of fifteen (15) feet of separation from any existing or proposed structures and/or foundations, except where the service line or lateral enters the building.

(3) A minimum of five (5) feet of separation horizontally from the lip of gutter to the utility is required during the placement of all existing or proposed wet utility lines.

(4) A minimum of five (5) feet radial clearance between any above ground infrastructure and a fire hydrant. No above ground installation shall block the view or accessibility of any fire hydrant.

(5) Horizontal utility crossings: A minimum of five (5) feet of separation between waterlines and sewer infrastructure (manholes, inlets, and appurtenances); exceptions may be considered when the waterline is higher than the elevation of the base of the sewer infrastructure.

(6) If it is not possible to achieve ten (10) feet of separation of the water and sewer service laterals due to the size, location, or other physical restraints of the lot, the lines may be installed in the same trench with the approval of the City Engineer and under the following conditions:

a. The water service shall be installed eighteen (18) inches above the sewer service on a separately excavated shelf of undisturbed soil in the common trench.
b. Cover of 4-1/2 feet shall be maintained as a minimum over the water service.

(7) Clearance from existing electric utility underground lines and vaults shall be three (3) feet when the exact location has been determined by pot holing the infrastructure. Maintain a minimum of three (3) feet of clearance on either side of proposed underground electric distribution facilities.

(8) Maintain a minimum of three (3) feet clearance between above ground infrastructure and the sides and back of any above ground electric distribution facilities and a minimum of ten (10) feet in front of doors or openings.

(9) Maintain ten (10) feet of clearance from overhead electric lines and ten (10) feet from poles and anchors. If this is not feasible, or conditions warrant additional protection or pole stabilization, the Contractor shall contact Longmont Power & Communications.

(10) Open trenches shall not be within a 1H:1V slope area of pavement, curbs, gutter, or sidewalks. Any pavement, curbs, gutters, or sidewalks that are undermined by excavation shall be removed and replaced.

B. VERTICAL SEPARATION AND CROSSINGS

In the event that a water main, sanitary sewer main, or storm sewer main cross each other, the following requirements apply:

(1) Water main crossings shall have an eighteen (18) inch vertical separation, minimum, from outside wall to outside wall with the sewer main being crossed.

(2) Where a sanitary sewer main or storm sewer main crosses a water line and the sewer main is above the water main or less than eighteen (18) inches clear distance vertically below the water main, then the water main shall be a full length of DIP or PVC pipe and centered on the sewer main crossing. Refer to pipe crossing support pad and utility crossing details.

(3) If the crossing is a sewer main made of concrete or vitrified clay pipe, it shall be replaced with a twenty (20) foot length of SDR-35 PVC pipe centered on the water main. Watertight transition couplings shall be used to join the PVC pipe to the existing sewer pipe. The transition couplings shall be solid sleeve and have an interior and exterior fusion bonded epoxy coating, stainless hardware and be externally wrapped with ten (10) mil thick polyethylene. Other requirements may be imposed by the City Engineer on a case-by-case basis.

(4) In all cases, bedding material or other approved structural protection shall be provided to preclude settling and/or failure of the higher pipe.

(5) Separation of sanitary sewer mains and storm sewer mains will be reviewed on a case-by-case basis.

(6) A minimum of eighteen (18) inches of vertical separation shall be maintained for lateral crossings of electric distribution facilities. Dry utilities with vertical separation less than eighteen (18) inches will be reviewed on a case-by-case basis, depending on the circumstances of the project.

C. LANDSCAPE REQUIREMENTS

(1) Trees shall be located a minimum of ten (10) feet away from all underground utilities measured from the edge of utility pipe. Shrubs shall be located a minimum of five (5) feet away from all utility infrastructure, including above ground appurtenances.

(2) No trees, shrubs, ground cover, boulders, berms, fences, or other improvements exceeding thirty-six (36) inches in height, measured from surface of travel lane adjacent to planting area, shall be planted within the site distance triangle or within six (6) feet of a vehicle travel lane.

(3) Trees shall be planted in the center of the tree lawn area between edge of sidewalk and back of curb when space is less than twelve (12) feet wide. No trees are to be planted in areas narrower than eight

(8) feet in width without approval from the City Forester and an approved Exception from the City Engineer, unless otherwise allowed in the City Standards.

(4) There shall be a minimum distance of eight (8) feet between trees and adjacent vertical surfaces and structures unless an exception is obtained. Trees shall be spaced to accommodate the full canopy of the mature tree and proper root zone. Reference City Standards Section 605 for more information.

(5) Minor trimming and branch removal for street trees shall be performed to maintain a minimum clearance of fifteen (15) feet above roadways or eight (8) feet above sidewalks and sidepaths.

(6) For required clearances between landscaping and existing or proposed electrical cabinets, vaults or other infrastructure, refer to City Standards Section 700 Longmont Power and Communications for more information. Electrical facility clearance restrictions are as follows:

   a. Residential metering pedestal or pit: six (6) inch maximum height within four (4) feet of the window (meter) side of the cabinet and forty (40) inches maximum height within two (2) feet elsewhere.
   b. Climbing vines shall not be located adjacent to electric facility poles.
   c. Electrical Vaults: no landscape material on top of the vault; vegetation shall have six (6) inch maximum height within four (4) feet of the vault.
   d. Pad mount switchgear and cabinets: sod, cobble, mulch, or other low growing shrubs or groundcover only within ten (10) feet of the unit doors.
   e. Residential pad mount transformers: no tree canopy over the transformer, landscape material on top of the pad, or in front of the transformer (street side) shall be used.

104.00 CONSTRUCTION

104.01 GENERAL INFORMATION

A. An approved set of plans and specifications shall be on file with the City prior to the Contractor beginning construction on a project. All applicable contracts, bonds, insurance, permits, and licenses shall be fully executed by the Contractor and all applicable parties before beginning work. Contractor shall have a copy of these City Standards on site at all times during construction.

B. The Contractor shall obtain written approval from any private property owner prior to commencing work on private property and provide this to the City.

104.02 COMMENCEMENT OF CONSTRUCTION

A. Construction shall commence within one (1) year of the approved date shown on the plans, or plans shall be resubmitted for review and approval. If construction is halted for more than one (1) year (12 consecutive months), plans shall be resubmitted to the City for review and approval. Modifications to the design may be required to bring the improvements up to current standards.

B. If construction does not commence within six (6) months of the approved date shown on the plans, Longmont Power & Communications reserves the right to modify the design or fees to reflect changes in standards or costs.

C. All improvements shall be accurately surveyed and staked in accordance with the approved plans prior to their construction. The Contractor shall be responsible for the preservation of all such staking and any necessary re-staking.

104.03 PRE-CONSTRUCTION MEETING

A. The Contractor shall be required to schedule a Pre-Construction Meeting to be held at least forty-eight (48) hours prior to the start of any construction. The Pre-Construction Meeting for development projects may not be scheduled until after the PIA has been approved and the City has received final plans. The Contractor, Owner, City Engineer, Design Professional, City Inspector, and all other applicable subcontractors shall be in attendance. At the time of the meeting, it shall be the Contractor's responsibility to assign one contact person to be responsible for coordinating all field changes and communications.

B. The Contractor shall be required to schedule a Pre-Paving Meeting to be held at least forty-eight (48) hours prior to paving. The Contractor, Owner, Soils Engineer, Design Professional, City Engineer, and City Inspector shall be in attendance.

C. The Contractor shall be required to schedule a Landscape and Irrigation Pre-Construction Meeting to be held at least forty-eight (48) hours prior to the start of any construction for these trades for these improvements. The Landscape and Irrigation Contractor, Owner, City Engineer, City Inspector, and all other subcontractors shall be in attendance. At the time of the meeting, it shall be the Contractor's responsibility to assign one contact person to be responsible for coordinating all field changes and communications related to the landscape and irrigation construction if different than the overall project contact.

104.04 PLANS ACCESSIBLE AT CONSTRUCTION SITE

The Contractor shall be required to have a set of plans approved by the City on site at all times during construction. The Contractor is also required to have Stormwater Pollution Control plans, updated to current conditions, on site at all times. The plans shall include any approved revisions and, where applicable, shall be signed and sealed by the Design Professional.

104.05 PERMITS

A. The Contractor shall obtain all necessary permits for construction unless otherwise directed by the City. All permits shall be in accordance with Federal, State, County, City, and other Local requirements. City review and approval of all permits shall be accomplished prior to the start of any construction. Examples of permits that may be required, and locations where initial contact is to be made, are as follows:

PARTIAL LIST OF PERMITS	**CONTACT**
Access Permit	CDOT, City of Longmont Public Works
Air Pollutant Emissions Notice Air Permit	CDPHE
Construction Dewatering Permit	CDPHE
General Purpose: Water Well Permit	Colorado DWR
Floodplain Development Permit	City of Longmont Public Works
Irrigation Ditch Crossings and Improvements	Ditch Company
Infrastructure Permit	City of Longmont Public Works
Permanent Stormwater Control Permit	City of Longmont
Railroad Use of Right of Way	Railroad Company
Railroad Work in Right of Way	Railroad Company
Section 404 Permit	USACE
Stormwater Construction Activity Permit	City of Longmont Public Works
Construction Stormwater Discharge Permits	CDPHE
Temporary Water Use Permit	City of Longmont Water & Waste
Use of Public Places Permit	Planning & Development Services
Utility and Special Use Permit	CDOT
Work in Right-of-Way Permit	City of Longmont Public Works

(1) This list is provided as an aid and shall not be interpreted as a complete list of all permits required. It shall be the responsibility of the Contractor to determine the type of permits required for the specific project. A copy of all permits shall be available for inspection on the job site at all times.

B. All required permit and LPC fees shall be paid in advance, prior to commencement of any construction. No construction work shall be started until the Contractor has obtained all appropriate permit(s) for the project and provided copies to the City.

104.06 STORMWATER QUALITY

A. The Contractor shall protect the environment, including the water quality of watercourses, waterbodies, and wetlands, and the health, safety, and welfare of the public by preventing the discharge of pollutants to the City municipal separate storm sewer system (MS4). Pollution control shall be implemented through regulation and control of public and private activities that are sources of pollutants to the MS4 as mandated under Chapter 14.26, City Code. The regulations in this chapter enable the City to comply with the requirements of the Federal Clean Water Act, the State of Colorado Water Quality Act, and other applicable Federal and State laws.

B. The Contractor is required to obtain City-issued stormwater quality permits per requirements outlined in Chapter 14.26, City Code. In addition, the Contractor is also required to obtain all Colorado Department of Public Health and Environment issued stormwater quality permits per State regulations.

C. As part of all construction activities, it is unlawful to cause materials to be deposited or remain in such a manner or location as to constitute an illegal discharge into the MS4 or Waters of the State. The Contractor shall be required to implement all necessary control measures to prevent any such illegal discharge of pollutants.

104.07 SUSTAINABILITY

A. It shall be the Contractor's responsibility to develop a waste management plan whose aim shall be a minimum fifty (50) percent, by weight, end-of-project rate for salvage/recycling of total waste generated by the Work.
   (1) The Contractor shall aim to recycle, reuse, or donate one hundred (100) percent of all clean concrete, asphalt, wood, metal, and cardboard waste.

104.08 SAFETY AND PROTECTION

A. Contractor shall comply with all applicable Federal, State, and/or local laws and regulations of any public body with jurisdiction. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Development. Specifically, the Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
   (1) All workers at the construction site and other persons and entities that may be impacted by activities at the project site.
   (2) All buildings, structures, facilities, work, materials, and equipment to be used at or incorporated into the Development.
   (3) Other public property and private property not owned by the Developer/Owner at the site or adjacent thereto not designated for removal, relocation or replacement during construction, including but not limited to: trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and underground facilities.

B. Contractor shall notify owners of adjacent property, underground facilities, utilities, and other similar items, in writing, when progress of the Development work may affect them. The Contractor shall cooperate with these owners in the protection, removal, relocation, and replacement of their property, when needed.

C. All damage, injury, or loss to any property caused directly or indirectly by the Developer/Owner, Contractor, Subcontractor, Supplier, or any of their agents or employees, or any other person or organization directly or indirectly related to the Contractor, shall be the responsibility of the Contractor and shall be remedied by the Contractor within the limitations described in section 104.09 below. The Contractor's duties and responsibilities for the safety and protection of the work site, including everything identified in section 104.08(A) above, shall continue until such time as all the work is completed and accepted by the City.
   (1) If the City Engineer or designee deems a situation unsafe during the pendency of the project, the City Engineer shall notify the Contractor, and the Contractor shall take the necessary steps to correct the situation within the timeframe identified by the City Engineer. In addition, if there is a threat to the health, welfare, or safety of the public, the City may, at the expense of the Contractor, take immediate action to correct any hazardous or other such condition at any time during

construction and up until Final Acceptance. Nothing within this provision shall be construed as relieving the Contractor of responsibility for initiating, maintaining, or supervising all safety precautions and programs in connection with the work.

104.09 RESPONSIBILITY FOR DAMAGE

A. Should any public or private utility or public or private property be damaged during construction operations, the Contractor shall immediately notify the City and the Owner of such utility or private property of such damage and, unless authorized in writing by the Owner of the utility or private property, the Contractor shall not attempt to make repairs, except as otherwise identified herein in specific sections. If so authorized to make repairs, the Contractor shall repair or replace the property, and such replacement shall be of equal or better quality than the original. Any replacement shall meet the requirements of the City Standards. The determination of whether the property was adequately replaced shall be at the City's discretion. If the Contractor is not authorized to make repairs, the City or the property owner may make repairs themselves and bill the cost of such repairs to the Contractor to be reimbursed by the Contractor within a reasonable period of time identified by the City.

B. The City, its officers, agents, or employees, shall not be liable for any injury to persons or property occasioned by reason of the acts or omissions of Owner, Developer, Contractor or any of their agents, employees, contractors, and subcontractors for any activities related to the Development. The Owner, Developer, and/or the Contractor shall indemnify and save harmless the City, its officers, agents, and employees, against any and all claims, demands, causes of action, liabilities or losses of any sort, damages, fines, penalties, attorney fees, and costs arising during or after the term of the Development activities because of or arising from, in whole or in part, any actions or omissions attributable to the Owner, Developer, or Contractor, or their officers, employees, contractors, or agents, in the performance of or in any way associated with the Development, associated improvements, and any parts thereof. Acceptance by the City of the public improvements shall not constitute an assumption by the City of any responsibility for any damage or taking related to the Development.

105.00 CONTROL OF WORK

105.01 CHANGES FROM APPROVED PLANS

The Design Professional shall submit proposed changes to the approved plans, or specifications, related to public improvements to the City Engineer, and, once approved, distribute approved copies to the Contractor, City Inspector and Owner prior to construction. No work shall proceed on that portion of the project being revised until said revisions are submitted, approved, and distributed as required above. The City shall respond promptly and in writing to such requests. Approval of even minor changes from the plans or specifications shall require permission from the City Engineer. This procedure shall be followed for all changes whether requested by the City, the Design Professional, the Contractor, or the Owner. All plan changes shall be reflected on Record Drawings.

105.02 NOTIFICATION OF DESIGN ERRORS

Should any omissions or design errors be discovered after final approval of the plans, the person or agency discovering the omission or error shall notify the City Engineer, the Owner, and the Design Professional. If the Contractor is unaware, the Owner shall notify them, and no work shall be allowed in the affected area until revisions are made by the Design Professional and approved by the City.

105.03 AUTHORITY OF THE CITY ENGINEER

A. The City Engineer is authorized to enforce all provisions of these City Standards or may appoint an Engineer, City Inspector, any other related technical employee, or any consulting firm engaged specifically to act on the City Engineer’s behalf.

B. The City Engineer has the authority to order work to be stopped if it is contrary to the provisions of the City Standards. Notice of such will be presented to the Contractor, Design Professional, or Owner's representative in writing, and work shall be stopped until authorization to proceed is received from the City Engineer.

105.04 AUTHORITY OF THE CITY INSPECTOR

A. The City Inspector is authorized to check all work performed in connection with construction of the project. The City Inspector shall have the authority to reject defective or inferior materials, or workmanship in cases where it is judged to be unacceptable, substandard, defective, unsafe, or not in accordance with City Standards, sound construction practices, and/or sound engineering judgment. The City Inspector has the authority to suspend work until any questions can be resolved by the City Engineer and shall advise the Contractor in complying with the drawings and City Standards. If the City Inspector or City Engineer deems it necessary, any previously covered work shall be exposed at the Contractor's expense. The Contractor shall immediately correct any defective materials or poor workmanship as determined by the City Inspector. The City Engineer and City Inspector shall, at all times, have reasonable and safe access to the work whenever it is in preparation or progress and the Contractor shall provide proper facilities and precautions for such access and inspection.

B. The City Inspector shall not, in any case, act as foreman or perform duties for the Contractor, nor provide line and grade stakes, nor take an active part in the management of the work done by the Contractor. The presence or absence of the City Inspector shall not relieve any responsibility or obligation of the Contractor. The City Inspector is present on the site to advise Contractors on, and to enforce compliance with, these City Standards.

C. The City Inspector has inspection authority to inspect the following work:
   (1) Construction of public improvements.
   (2) Existing water and wastewater systems and connections to the existing water and wastewater system. Any water or sanitary sewer service line installation from the main to a point two (2) feet away from any building.
   (3) Existing and proposed electrical system and connections to the existing electrical system.
   (4) Construction of the underground service connection up to the building.
   (5) City maintained concrete trail layout, landscape, and irrigation construction performed in areas maintained and/or owned by the City.
   (6) The Stormwater Construction Activity Permit (SCAP) that ensures all permittees install and maintain sediment and erosion control measures to protect the Municipal Separate Storm Sewer System (MS4) from any and all illegal discharges.
   (7) Over any and all other items or processes during the work that the City deems necessary.
   (8) The Building Inspector (an authorized representative of the Building Official) has inspection authority over construction within two (2) feet of the building envelope and including within the building.

105.05 INSPECTION REQUIREMENTS

A. The City Inspector shall be notified at least twenty-four (24) hours in advance of any construction activity that required an inspection. Inspections are required as identified in these City Standards.

B. No pipes, joints, or service connections shall be covered until they have been inspected by the City Engineer or City Inspector.

C. The Contractor is to supply any inspection aids that are necessary for inspection, such as a pump system for hydrostatic testing and a compression system for air testing of sanitary sewer lines.

D. Regardless of when a deficiency is discovered during construction or the warranty period, it is the responsibility of the Contractor to meet the requirements of the City's Standards and the requirements of the Contract Documents.

E. If a project holds a Stormwater Discharge Permit for Construction Activities from CDPHE, the project is required to be inspected by the Contractor every fourteen (14) days and after each major storm event to ensure compliance with the approved Stormwater Management Plan. The City Stormwater Construction Activity Permit is a separate process that requires the City Inspector to perform on-going stormwater inspections to verify that erosion control measures are installed adequately and maintained regularly. All sites shall be assessed on how well their stormwater erosion control measures protect the City's MS4 from any and all illegal discharges. SCAP inspections continue until the permit is formally terminated.

F. This is a non-exclusive list; the inspector may impose other requirements as necessary.

105.06 TESTING

All tests required by the City Standards shall be performed by a testing agency approved by the City and paid for by the Contractor. If the materials or methods used do not comply with City Standards, the City Engineer may require that additional tests be performed to ensure compliance with City Standards. Testing methods and location shall be as specified herein or as required by the City Engineer. All testing results for testing required by the City Standards shall be made available to the City directly from the testing agency.

105.07 LIABILITY

The City, the City Engineer, or any authorized representatives charged with the enforcement of these City Standards, shall not be liable for any damage that may accrue to persons or property as a result of any act or by reason of any act or omission in the discharge of their duties. Nothing in these City Standards is intended to waive, eliminate, or modify the immunity, protections, and/or requirements of the Colorado Governmental Immunity Act, C.R.S. § 24-10-101 et seq.

106.00 CONTROL OF MATERIALS

106.01 GENERAL INFORMATION

All materials and equipment shall be of a quality acceptable to the City. As required by the City Engineer, the Contractor shall furnish satisfactory documentation (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, conditioned, and any other required action performed in accordance with the instructions of the applicable supplier except as otherwise provided in the plans, the PIA, or any other relevant documents. No provision of any such instructions will be effective to assign to the City, or any of the City's representatives, any duty or authority to supervise or direct the furnishing or performance of the work.

106.02 CERTIFICATES AND WARRANTIES FROM MANUFACTURER

When deemed necessary by the City Engineer, the Contractor shall submit a certificate to the City Engineer, secured from manufacturer, of all the material used as a permanent part of the project, certifying that their product as used on the project conforms to all City Standards. No material shall be used until the certificates are approved by the City Engineer. Where materials, equipment, or other property are to be transferred to and accepted by the City, the Contractor shall assign all applicable warranties to the City (if such warranties are assignable), or, if not assigned to the City, the Contractor shall make all warranty claims on behalf of the City.

106.03 MANUFACTURER'S SPECIFICATIONS OR RECOMMENDATIONS

All manufacturer's recommendations, instructions, or specifications regarding installation and use of products shall be followed. Any conflict between the manufacturer's instructions and these City Standards shall be decided and settled by the City Engineer, whose determination shall be final. All manufacturer's instructions and submittals shall be presented to the City Engineer for approval prior to scheduling a pre-construction meeting.

106.04 APPROVED MATERIALS LIST

(1) The City shall maintain a list of approved materials for use in the construction of public improvements as outlined in these City Standards.
(2) Concerned parties may submit a request in writing for a material to be included in the current list of approved materials.
(3) The submittal shall include all of the manufacturer's specifications concerning the design, installation, intended use, and any other information that is requested by the City Engineer.
(4) If the submittal is determined to be appropriate by the City Engineer, the evaluation of the materials shall be made by a committee convened by the City Engineer. The committee shall be composed of a minimum of three (3) representatives from the City. The City Engineer shall act as chairperson and the remaining committee members will represent the City divisions affected by the proposed product or material.
(5) If an accepted product fails to perform as anticipated or if there is a change related to the availability of repair or replacement parts, the product may be excluded from the Approved Materials List.
(6) Materials or products not included in the Approved Materials List shall not be used in construction unless an exception is granted in accordance with the City Standards Section 100.08 "Exceptions".

A. EVALUATIONS

(1) The review committee members will give due consideration to the products or methods based upon their collective experience and any relevant documentation. The review committee members will

review existing criteria or will develop criteria by which the product or methods can be evaluated. If needed, the review committee may seek out subject matter expertise within and outside the City to determine whether the product is acceptable.

(2) If necessary, the committee chairperson will contact the concerned party for additional data, for product samples, and to arrange for testing.

B. TESTING

(1) A testing program for a proposed material may be undertaken at the discretion of the City Engineer and with the concurrence of the concerned party. The review committee shall arrange field testing procedures. The concerned party shall furnish samples to be tested, any special test equipment not already available to the review committee, any necessary appurtenant materials, pipe, gauges, charts, recording equipment, and, when necessary, a location to conduct the tests. In some instances, testing may consist of trial installations in the field. Determination of the nature of the testing shall rest with the City, and the City reserves the right to require full reimbursement for testing and evaluation expenses.

(2) Testing shall be undertaken with the objective of clearly determining the acceptability of the product. For some products where durability is in question, the test period may last for several years. The City's goal will be to make an adequate determination within a reasonable time frame. All costs and expenses of testing of the product shall be borne by the concerned party proposing the new product.

(3) Following completion of tests, the committee will meet with the concerned party to discuss results and any further testing or consideration. The committee will then discuss the product and reach a decision.

C. NOTIFICATION

The City Engineer shall notify the concerned party in writing of the committee's decision to either accept the product, and include it with the Approved Materials List, or reject the product as unacceptable. Notification shall be made within thirty (30) working days of the completion of any testing. If the product is identified for inclusion, the inclusion shall be made within six (6) months of notification.

D. APPEAL

If the product is rejected and if the concerned party has good reason to feel that their product did not receive an adequate or fair test or was otherwise improperly rejected, the concerned party may appeal in writing within thirty (30) days of notification to the City. The concerned party shall fully document their case and ask for reconsideration based on new facts, testing, late results, or other factual basis. If the City finds reason for further consideration, the City will arrange for a meeting with the concerned party, the City Engineer, and any other City employee who might contribute, to consider further testing or evaluation. A subsequent final decision shall be made in writing under the signature of the City Engineer. If the City does not find sufficient cause to further investigate the matter, the City Engineer shall advise the concerned party in writing, and that decision shall be final.

E. LIMITATION ON REAPPLICATIONS

If, after a product is rejected, significant changes are incorporated into its manufacturing that might render it acceptable, the concerned party may reapply to the City Engineer for reconsideration. In the absence of changed conditions, the product or method shall not be reconsidered for inclusion for a period of three (3) years after having been rejected.

107.00 CONTROL OF SITE

107.01 UTILITY LOCATES

A. It is the Contractor's responsibility to request utility locates in accordance with the 811 law (C.R.S. 9-1.5-101).

B. The Contractor shall notify all utility companies and locate all existing utilities on and near the site prior to construction in accordance with all State and Local requirements.

C. All affected parties shall be notified by the Contractor at least four (4) days in advance of the commencement of work in order to ensure that there will not be any unexpected interruptions of services during construction.

D. Standby requirements – any excavation or utility crossing within eighteen (18) inches of city infrastructure may require a utility standby. When a standby is requested, as reported as a response from a city locate to the 811 program, the excavator shall schedule a standby with the City of Longmont by calling (303) 651-8416.

107.02 CONSTRUCTION WATER

All water needed for approved construction use shall be obtained from either a private supply, an approved tank loading facility, or by a City Temporary Water Use permit (see City webpage). Use of an existing city service/water meter for construction water is not allowed. Temporary use of potable water from the City's water distribution system for construction purposes by means of fire hydrant or other devices shall require a permit from the City and is subject to availability. The permit shall include provisions for payment of water used, use of a bulk water fill station, or the installation of a meter and an approved backflow prevention assembly, deposit, and daily rental charge. Existing city services shall not be utilized for construction water needs.

107.03 RELOCATION OF EXISTING UTILITIES

During construction, if it is determined that any underground utility(ies) are required to be relocated or removed including, but not limited to, sanitary sewer mains, water mains, electric and communication lines, traffic signal loops, gas mains, drainage and ditch structures, irrigation pipes, and any other below grade or above ground facilities, the Contractor shall notify the utility owner and the City immediately so that any necessary arrangements can be made. Relocation of any such utilities shall be at the Contractor's and/or the Owner's sole expense and liability.

107.04 INTERRUPTION OF WATER, WASTEWATER, AND STORM SEWER

The Contractor shall obtain approval from the City Engineer four (4) working days in advance of any construction which shall result in the interruption of service to an existing City customer. Once approval is obtained, the following steps shall be completed:

A. With approval of the City Inspector, the Contractor shall give notice in writing forty-eight (48) hours in advance to all affected Customers. Notices shall include appropriate information concerning interruption of services and instruction on how to limit the Customer's inconvenience. An attempt shall be made to deliver the notice personally to the Customer, otherwise the notice shall be left at the Customer's door.

B. In commercial areas, any disruption of service shall be undertaken only after said disruption has been coordinated with the City and the private property owner. Coordination shall be required for both the

service change over and any connections made to the existing system. Interruptions of service to Customers shall be kept to a minimum length of time.

C. A normal interruption of service (outage) shall be a maximum of four (4) hours. If the outage is greater than four (4) hours, then work shall be done in a manner so as to minimize the inconvenience to the Customers as directed by the City Engineer or City Inspector.

D. If, in the process of installing a connection, there exists an industry or building that cannot be without utility services for any length of time, the Contractor shall be required to provide alternative means, approved by the City, of providing services to the affected Customer during the interruption of regular service.

107.05 SWEEPING AND CLEANING OF ROADS AND ROW DURING CONSTRUCTION

A. The Contractor shall be responsible for the removal and proper disposal of all construction debris, dirt, and mud from all the public land, rights-of-way, easements, private property or driveways, and parking lots within or adjacent to the project area, whether caused directly by the Contractor's construction operation or that of subcontractors or material suppliers, or indirectly due to the work site conditions in general. Failure to identify, remove, and dispose of pollutants by the Contractor as promptly as possible shall cause the City to issue a Notice of Violation which may include a Civil Penalty, a Stop Work Order (Orange Tag) and/or a Cost of Abatement in the event that the City must remove the pollutants and then make a claim against the Contractor and/or the Owner for any costs incurred by the City. Additional enforcement and/or penalties shall be in accordance with Section 14.26, City Code.
   (1) The Contractor shall be responsible for any damage caused due to maintenance or cleaning operations or the lack thereof.

107.06 MATERIAL STORAGE AND HANDLING

All materials shall be stored in a manner so as to preserve their quality and suitability for the work. All pipe, fittings, valves, hydrants, and accessories shall be loaded and unloaded by lifting with hoists, skidding, or by hand so as to avoid shock or damage. Under no circumstances shall materials be dropped. Pipe handled on skidways shall not be skidded or rolled against pipe already unloaded. Cast iron, ductile iron, and steel pipe shall be handled so that the coating or lining is not damaged. If any part of the coating or lining is damaged, repair shall be made to the satisfaction of the City Engineer by the Contractor and/or Owner at no expense to the City. Any material judged by the City Inspector to be damaged beyond repair or that is not in conformance with the City Standards shall be rejected.

107.07 LANDSCAPE PROTECTION

The Contractor shall avoid disturbing existing landscape and plant material not specified for removal. Unless otherwise stipulated in the approved plans, or addressed by other City regulations, areas of landscaping disturbed by construction shall be returned to original or better condition by the Contractor within a reasonable period of time identified by the City. All materials and workmanship for replacement of landscape and plant material shall be approved by the City and shall comply with the City's appropriate landscape requirements.

107.08 FINAL CLEANUP

A. All surplus materials, tools, and temporary structures furnished or used by the Contractor shall be removed from the site by the Contractor when the project is complete. All debris and rubbish caused by the Contractor's operations shall be removed by the Contractor and the areas occupied during operations shall be restored to their original condition within a reasonable period of time determined by the City, unless

otherwise directed by the City Engineer. All surplus supplies furnished and delivered by the City shall be returned to the City by the Contractor when the work is complete.

B. The burning of material is not permitted within the jurisdictional area of the City. The disposal of material is the responsibility of the Contractor and shall be done in a manner that is approved by the City and in compliance with applicable laws. The Contractor shall not dispose of material or debris within the project limits. The Contractor is responsible for obtaining an approved and legal site for the disposal of clearing and grubbing materials, debris, rubbish and trash, excavated rock, excess excavated materials, and materials not suitable for backfilling. Removed concrete material may be used to construct embankments only if approved by the City Engineer. All pavements, sidewalks, structures, curbs, gutters, etc. not designated to remain shall be disposed of as debris. If materials are disposed of on private property, written permission shall be obtained from the property owner and a copy of such shall be provided to the City Engineer.

107.09 SITE STABILIZATION

If no construction activities take place on-site for thirty (30) days or more, the Contractor is responsible for stabilizing the entire site including all landscaped portions of the site to achieve Final Stabilization with a landscape material consistent with the approved landscaping plan and all seeded areas stabilized with a seed mix identified in the Approved Material List in Section 600 or an equivalent approved by the City Engineer. Final Stabilization is a condition reached when all ground surface disturbing activities at the site have been completed and a uniform vegetative cover has been established with an individual plant density of at least 70% of pre-disturbance levels, or equivalent permanent, physical erosion reduction methods have been employed, as approved by the City Engineer.

108.00 ACCEPTANCE OF WORK

108.01 GENERAL

Acceptance of the Public Improvements is a two-step process which involves Construction Acceptance and Final Acceptance as outlined below.

108.02 RECORD DRAWINGS

A. Prior to Construction Acceptance and upon completion of the project, it shall be the responsibility of the Contractor to provide the City Engineer with one (1) set of digital Record Drawings at the same scale as the original construction plan set for all public improvements, including landscape and irrigation, that indicates any revisions to the aforementioned. Irrigation Record Drawings shall meet the requirements of the City Standards Section 602 Completion Services.
   (1) The format of Record Drawings shall be a plan set with 24 x 36-inch digital sheets (PDF) that are scalable to 11 x 17-inch size. A Certification Statement shall be signed and stamped by the Design Engineer and included on the cover sheet of the digital PDF. Revisions shall be clouded, numbered, and lined out on the Record Drawings. Erasures are not allowed. A checklist of the information to be included on Record Drawings can be found in the Appendices.

B. There is a separate As-built Survey checklist for projects impacting the floodplain which require LOMR or LOMR-F FEMA submittals. The checklist is also included in the Appendices.

C. Record Drawings shall include geospatially referenced CAD files.

108.03 CONSTRUCTION ACCEPTANCE

A. Construction Acceptance will be granted when all capital and public improvements are approved by the City Engineer as detailed in the construction plans and, if applicable, the Public Improvement Agreement.

B. Minimum requirements for Construction Acceptance of public improvements are as follows:
   (1) Utilities. All utility lines and services shall be installed, backfilled, compacted, and have passed required testing, and all valves, fire hydrants, and manholes shall be brought to grade.
   (2) Streets. All concrete and paving, except the final top lift of asphalt for development projects, shall be complete.
   (3) Landscape and Irrigation. All concrete trails, irrigation, and landscape shall be installed and have passed all inspections.
   (4) Permanent Stormwater Control Measures. All post-construction permanent stormwater control measures shall be installed and have passed all inspections.

C. Public improvements shall be completed in strict compliance with the approved plans. Upon completion of all capital improvement projects and public improvement installations on development projects, the Contractor shall contact the City Engineer, and the City Engineer shall notify staff to perform inspections for construction acceptance to determine the acceptability of the work completed. If deficiencies are observed, the City Engineer shall issue a denial letter for development projects which shall include a construction acceptance punchlist, or a Notice of Substantial Completion for capital improvement projects, outlining the repairs required. The Contractor shall repair all deficiencies identified to obtain Construction Acceptance.
   (1) The construction acceptance inspection for landscaping and irrigation improvements shall occur during the growing season between April and October. City Inspector shall not inspect the landscape and irrigation portions during the dormant season between the months of November and April. If the

Contractor is not able to obtain Construction Acceptance from the City for outstanding items prior to October, then Construction Acceptance for all public improvements may be delayed.

D. For capital improvement projects, once all capital improvements are found acceptable and complete, including final clean up and the Contractor is no longer on-site, the City Engineer shall issue the Notice of Construction Acceptance.

E. For development projects, the Owner shall submit a repair schedule for the review and approval of the City Engineer, within thirty (30) days of receipt of a denial letter and construction acceptance punchlist. If Owner does not meet the schedule, the City may use the project's financial securities to complete the required repairs. If the Owner's proposed repair schedule extends beyond the current life of the financial securities, the securities shall be extended to cover the repair period. Once public improvements are found acceptable, a letter of Construction Acceptance shall be issued by the City Engineer. Notice of Construction Acceptance initiates the warranty period, and the Owner shall guarantee all work free of defects in workmanship or materials for a minimum of one (1) year and until Final Acceptance is issued. The Owner shall be responsible for maintenance during the warranty period and shall be responsible for correcting any deficiencies that occur prior to Final Acceptance.

F. The applicant shall submit a Stormwater Facility Certification as part of the record drawings for Construction Acceptance. Please refer to the appendix for additional requirements for the record drawings. Chapter 2, of the LSDCM, also provides additional, high-level guidance for record drawings associated with drainage.

G. The applicant shall submit an Operations and Maintenance Manual for any permanent stormwater control measures as part of the record drawings for Construction Acceptance.

108.04 FINAL ACCEPTANCE

A. CAPITAL IMPROVEMENT PROJECTS

A warranty claim can be made at any time during the warranty period by the City. The City Engineer shall complete the Notice of Warranty Work for all claims and send it to the Contractor for signature. The executed copy shall be sent to the Purchasing department. At the end of the Warranty Period the Purchasing department shall issue Final Acceptance to the City Engineer for execution. At this time the Contractor's financial securities shall be released.

B. DEVELOPMENT PROJECTS

A warranty claim can be made at any time during the warranty period by the City. Prior to the end of the warranty period the Owner shall request a final acceptance inspection from the City Engineer a minimum of thirty (30) days before the end of the warranty period. The City shall inspect the installed public improvements to determine compliance with City Standards, approved plans, specifications, and materials. If deficiencies are observed, the City Engineer shall issue a denial letter for development projects including a final acceptance punchlist outlining the items not in compliance. Any construction not meeting City Standards shall be brought into compliance within a reasonable period identified by the City.

C. An extended warranty may be accepted for portions of a project that do not fully meet City Standards at the time of inspection, at the City's discretion, to facilitate Final Acceptance. Securities for any extended warranty periods shall be required.

D. For City-owned landscaped areas it is the Contractor's responsibility to schedule Final Acceptance inspections during the growing season between April and October when plants are not dormant. Failure to do so may result in the delay of Final Acceptance until the following growing season.
   (1) If the landscape area is to be maintained by the City, the maintenance responsibilities shall transfer upon Final Acceptance. If it is to be maintained by the Owner, Contractor, or Homeowner's Association, the appropriate entity shall continue maintenance after Final Acceptance.

E. For Permanent Stormwater Controls, the Owner shall be required to identify a responsible party for all ongoing operations and maintenance of the facility or facilities associated with the development prior to the issuance of Final Acceptance.

F. Until Final Acceptance is granted, all maintenance and repair of improvements shall remain the responsibility of the Owner. If identified deficiencies are not corrected and finally accepted within 120 days after a warranty claim, the City may cause the required corrections to be made at the expense of the Owner. In addition, the City may suspend building permits or certificates of occupancy until the corrections are made and the work is completed in a satisfactory manner.

G. Final Acceptance shall be granted when requirements have been met for all public improvements and securities shall be released per the City Code.

109.00 UTILITY TRENCHING

109.01 GENERAL

A. The minimum trench width for wet utilities is eighteen (18) inches, unless otherwise approved by the City Engineer. Approval of trench widths less than eighteen (18) inches shall be based on the demonstration of the Contractor that suitable mechanical means of backfill compaction is available, and compaction is being obtained, or an approved non-shrinkable Flow-Fill material is being used for trench backfill.

B. Generally, the edge of the trench shall not be allowed closer than twelve (12) inches from concrete structures (i.e. curb and gutter, sidewalks, driveways, inlets, etc.) The actual distance shall be dependent upon the characteristics of the soil, the type of equipment that is used for trenching, and the methods used for excavation and backfill. If, as determined by the City Engineer, concrete structures are endangered by undermining of the structure or settlement, the structure may require replacement, special construction methods, or an increase in the distance of the trench from the structure.

C. All new underground facilities including utility mains and service laterals shall be installed with the means to be electronically locatable per state law. When designing and installing non-conductive underground utility facilities, the use of a tracer wire or an equivalent method is required as part of the design and installation. This allows for the facilities to be identified, located, and marked prior to future excavation activities.

D. Tracer wire shall be able to transmit on all eight frequencies: 512 Hz, 640 Hz, 8 kHz, 33 kHz, 65 kHz, 83 kHz, 131 kHz, and 200 kHz.

E. See City Standards Section 700 for LPC trench requirements.

109.02 MATERIALS

A. STABILIZATION MATERIALS

Stabilization material shall be 1-1/2 inch washed rock. A layer of geotextile fabric shall be placed between the stabilization material and the bedding material. Reference the Approved Materials List in the Appendices for types of geotextile fabric that are allowed. Under severe conditions, where the bottom of the trench is found to consist of material that is unstable to a degree that, as determined by the City Engineer, it cannot be removed and replaced with 1-1/2 inch rock and support the pipe properly, the Contractor shall construct a foundation for the pipe, consisting of piling, timbers, or other methods as approved by the City Engineer.

B. BEDDING MATERIALS

Bedding material shall conform to coarse aggregate gradation #8, #89, or #9 from the American Association of State Highway and Transportation Officials (AASHTO) Standard Specification for Sizes of Aggregate for Road and Bridge Construction (M 43). The coarse gradations #89 and #9, consisting of smaller aggregate sizes, are not to be utilized in instances where groundwater is present in the trench and for underdrain installations, unless otherwise approved by the City Engineer.

Table 1- 1 Bedding Material Gradation

Sieve Size	#8	#89	#9
1”	----	----	----
3/4”	----	----	----
1/2”	100	100	----

Sieve Size	#8	#89	#9
3/8”	85-100	90-100	100
#4	10-30	20-55	85-100
#8	0-10	5-30	10-40
#16	0-5	0-10	0-10
#50	----	0-5	0-5
#100	----	----	----

(1) The Contractor shall provide sieve analysis for on-site bedding material conforming to ASTM D422 for every 500 lineal feet of pipe installation to demonstrate that the bedding material conforms to the approved gradation. The sampling, testing, and reporting shall be performed by a qualified firm. The sample shall be taken from the on-site stockpile from which the material is being placed in the trench. The Contractor shall not place bedding material until the results of the sieve analysis are reported and shall remove material that does not meet the specified gradation. If, in the determination of the City Engineer, the stockpile has been compromised or does not meet gradation or material specifications of these City Standards, additional soils analysis shall be required.

C. BACKFILL MATERIAL

(1) All backfill material shall be free from frozen material, vegetation, or other organic material, cinders or other corrosive materials, debris, broken asphalt and concrete, and any other material that is not suitable in the determination of the City Engineer. Trench backfill material shall be free from any rocks or stones which are larger than six (6) inches, in any dimension. Rocks or stones which are larger than three (3) inches in any dimension shall not be placed within one (1) foot of pavement subgrade, or within one (1) foot of the finished surface of unpaved areas. Rocks or stones larger than two (2) inches in diameter may not be used for trench backfill of irrigation lines. Use of rocks, stones, or boulders within allowable size limits shall not interfere with proper compaction.

(2) Masses of moist, stiff clay and washed rock shall not be used as backfill material.

(3) When the type of backfill material is not indicated on the drawings or specified, the Contractor may backfill with the excavated material, provided that such material consists of loam, clay, sand, gravel, or other materials that, in the determination of the City Engineer, are suitable for backfilling. If excavated material is indicated on the drawings or specified for backfill, and there is a deficiency due to a rejection of part thereof, the Contractor shall furnish the required amount of approved material.

(4) If imported backfill is not required on the drawings and, in the determination of the City Engineer, should be used in any part of the work, the Contractor shall furnish and backfill with an approved material as directed by the City Engineer.

(5) Flow-Fill shall be a self-leveling, low strength concrete material composed of cement, fly ash, aggregates, water, chemical admixtures, and cellular foam for air entrainment that does not require compaction. Flow-Fill shall meet CDOT "Standard Specifications for Road and Bridge Construction,” Section 206 Structure Backfill (Flow-Fill) Specifications and the following requirements unless otherwise required by the City Engineer:

a. Slump of seven (7) to ten (10) inches (ASTM C143) or minimum flow consistency of six (6) inches (ASTM D6103)
b. Minimum 28-day strength: 50 psi (ASTM D4832)
c. Maximum 28-day strength: 100 psi
d. Removability Modulus (RM): 1.5 or less in areas requiring future excavation.

109.03 EXECUTION

A. GENERAL

Per City Standards Section 107.01 “Utility Locates”, the Contractor is required to perform utility locates prior to starting trench work. Utility installation shall be in compliance with approved construction plans and specifications. Trench construction for wet utilities shall be in compliance with Detail 100-03 “Water and Wastewater Utility Trench”. Trench construction for Longmont Power & Communications distribution system infrastructure shall be in compliance with City Standards Section 700.

B. REMOVAL OF ASPHALT SURFACES

(1) The Contractor shall remove and properly dispose of pavement and road surfaces as a part of trench excavation. The Contractor shall make an initial sawcut for trench width, then re-cut one (1) foot beyond trench excavation at time of patching. If the limits of the asphalt removal are within three (3) feet of the edge of pavement, the pavement shall be removed and replaced completely to its edge, per Detail 100-04, “Trench Limits for Asphalt Removal and Patch-Back". The width of pavement removed along the trench for the installation of pipe shall not exceed the width of the trench specified by more than one (1) foot on each side of the trench without approval of the City Engineer.

(2) The Contractor shall use full depth cutting or milling to ensure the removal of pavement in a straight line. The face of the remaining pavement shall remain approximately vertical. If the edge is damaged during construction, it shall be re-cut prior to final asphalt paving.

C. REMOVAL OF CONCRETE SURFACES

(1) The Contractor shall remove and properly dispose of pavement, sidewalks, and curb and gutter as a part of trench excavation.

(2) The Contractor shall use methods such as full depth saw cutting to ensure the removal of pavement in a straight line. The minimum area removed on road surfaces shall be one-quarter (1/4) of a panel section for panels no smaller than 12 x 10 feet otherwise the entire panel shall be removed. Remainder portions of a panel cannot be less than 6 x 5 feet per Detail 100-05, “Concrete Pavement Patch-Back".

(3) The minimum removal section for sidewalks and curb and gutter shall be five (5) feet in length, if the remaining section is a minimum of five (5) feet long. If the remaining section is less than five (5) feet long, the entire panel shall be removed and replaced.

(4) In order to allow for forming and patch-back, when removing curb and gutter or curbwalk abutting asphalt pavement, the Contractor shall remove the adjacent asphalt pavement and base course eighteen (18) inches wide and six (6) inches deep if any of the following conditions exist:

   a. The length of the removal is greater than thirty (30) feet.
   b. The asphalt at the edge of the existing concrete gutter lip is higher or lower than the lip of the concrete by one-half (1/2) inch or more.
   c. The edge of the existing asphalt pavement varies more than three-eighths (3/8) inch horizontally or vertically.
   d. The existing asphalt is cracked or distressed.
   e. Upon removal of the concrete the asphalt is chipped, deformed, undermined, or raised more than three-eighths (3/8) inch vertically or horizontally.

(5) If the removal of curb and gutter abutting asphalt does not meet any of the above conditions and, per the approval of the City Engineer, is allowed to be replaced without the removal of the adjacent asphalt, it shall meet the following criteria or it shall be removed and replaced along with the adjacent asphalt pavement:

   a. No voids exist between the concrete and asphalt.

b. The fall in the lip of the gutter section shall meet the required cross-section within +/- one-quarter (1/4) inch.
c. All other requirements of the construction have been met in accordance with City Standards.

D. CARE OF SURFACE MATERIAL FOR REUSE
All surface materials that, in the determination of the City Engineer, are suitable for reuse in the restoring of the surface shall be stockpiled separate from the general excavation materials. Surface materials as used herein are intended to include items such as gravel surfacing, landscape materials, topsoil, etc. It is not intended to include asphalt or concrete surfacing.

E. EXCAVATION
The trench shall be excavated to the depth required to provide proper bedding and support for the pipe. Any part of the bottom of the trench excavated below the specified grade shall be corrected with approved material as directed by the City Engineer. The subgrade shall be stable.

F. TRENCHING BY HAND OR MACHINE
When a Contractor excavates within eighteen (18) inches horizontally from the exterior sides of any marked underground facility, the Contractor shall use nondestructive means (either hand digging or hydro-excavation) of excavation to identify underground facilities. When utilizing trenchless excavation methods such as boring, the excavator shall expose underground facilities and visually observe the safe crossing of publicly owned, marked underground facilities.

G. PILING OF EXCAVATED MATERIAL
Unless otherwise approved by the City Engineer, all excavated material shall not be piled in a manner that endangers the work and shall not obstruct sidewalks, roadways, or driveways. Excavated material shall not be piled in a manner that obstructs the sight distance at driveways or intersections. This shall be determined in accordance with the sight distance criteria set forth in City Standards Section 207 “Intersection Design Criteria”. Hydrants under pressure, meter pit covers, valve boxes, electrical apparatus, manholes, inlets, and other utility controls shall be left unobstructed and accessible during construction, unless otherwise approved by the City Engineer. If an emergency access is needed to any utility which is blocked, whether previously approved or not, the Contractor shall be responsible for removing the obstruction. Curb and gutters and drainage swales shall be kept clear or other satisfactory provisions shall be made for street drainage and natural water courses shall not be obstructed.

H. SPECIAL TRENCHES OR INSTALLATIONS
Special trenches or installations, such as railroad, highway, or irrigation ditches, and utility crossings shall conform to the specifications and instructions of the authority whose facility, right-of-way, easement, or utility is involved. The Contractor shall confer with the representatives of the agency concerned to arrange the details for construction. The Contractor shall be responsible for all costs for repairing all damage incurred to property during construction. All work shall be completed to the satisfaction of the agency involved as well as the City Engineer.

I. ROCK EXCAVATION
Large rock, boulders, and large stones shall be removed from the trench to provide six (6) inches of clearance to each side of the pipe and below all pipe accessories. Excavations encountering rock or boulders below subgrade shall be refilled to subgrade with compacted material approved by the City Engineer. Blasting shall not be allowed without approval of City Engineer.

J. BORING

The requirements for boring and jacking of a line shall be determined on a case-by-case basis to enable coordination with the Owners and Agencies involved. Boring of utilities, whether service lines or main utility lines, shall be done in such a manner as to ensure that there is no settlement of the soil or surface improvements. The Contractor is responsible for all settlement and damage that occurs due to boring or jacking operations. Tunneling, resulting in voids under surface improvements, shall not be permitted.

K. TRENCH STABILIZATION

Where the trench subgrade is found to be soft, wet, unstable, or to include ashes, cinders, refuse, vegetable or other organic materials, or large pieces of inorganic materials that in the judgment of the City Engineer should be removed, the Contractor shall excavate and remove such unsuitable material to the width and depth determined by the City Engineer. Over excavated areas shall be backfilled with foundation material as specified under the Trench Backfill section below.

L. DEWATERING OF TRENCHES

Pipe trenches shall be kept free from water in an adequate and acceptable manner during excavation, fine grading, pipe laying and joining, and pipe bedding operations. Where the trench bottom is saturated or otherwise unstable because of the presence of groundwater, and in all cases where the static groundwater elevation is above the bottom of any trench or bell hole excavation, the groundwater shall be lowered by means of well points and pumps or by other means acceptable to the City Engineer, to the extent necessary to keep the trench free from water and the trench bottom stable at all times during construction. Surface water shall be diverted and otherwise prevented from entering trenches to the greatest extent practical without damage to the adjacent property from dikes, ditches, or impounded water. The Contractor shall clean the storm sewer system as part of site cleanup at completion of projects. It is the responsibility of the Contractor to obtain a Colorado Department of Public Health and Environment Water Quality Control Division “Construction Dewatering Permit” and be in compliance with all Federal, State, and Local laws and regulations.

M. UTILITY PIPE CROSSING

Utility pipe crossings shall be centered over any utility pipe being crossed and crossing utility pipes shall be aligned perpendicular (90°) where possible. The Contractor must provide minimum horizontal separation between pipes based on requirements in City Standards Section 103.09, “Utility Line Separation and Crossings”. If clearance is limited and spacing between pipes is less than eighteen (18) inches, utility pipes shall be supported per Detail 100-07, “Pipe Crossing Support Pad”, with approval of the City Engineer. Pipe crossing support pads for pipe sizes larger than twenty-four (24) inches require design submittal by a Professional Engineer and approval by the City Engineer. Bedding material for pipe crossing unable to meet clearance spacing is required to extend eight (8) inches below the lower pipe and twelve (12) inches above the upper pipe. The concrete forms for the support pads are designed to extend six (6) inches on either side of the outside pipe diameter and either be twelve (12) inches or eighteen (18) inches long, depending on the pipe size. The concrete form is required to cradle the upper pipe to the spring line of the pipe. A bond break shall be placed between concrete and the pipe being supported. For situations approved by the City Engineer where there are less than four (4) inches of vertical separation between the utility pipes in a crossing, or the crossing involves a water line, fiber board insulation in accordance with ASTM-C578, or an approved equal, shall be required to be installed between the pipes. The board should extend two (2) inches beyond the outside edges of the pipes.

N. CUT-OFF WALL CONSTRUCTION

In the situation that excessive groundwater is encountered, and no provisions have been made for groundwater drainage, clay or flow fill walls shall be required per Detail 100-08, “Cut-off Wall”. Cut-off walls shall be two (2) feet thick spanning the full width of the trench horizontally and extend vertically one (1) foot below the bottom of the trench to six (6) inches above the bedding material. Cut-off walls are to be located a minimum of every four hundred (400) feet along the trench. Cut-off walls shall also be located within twelve (12) feet on each side of open drainage ways and irrigation ditches as shown in the Detail 100-09, “Ditch Crossing”. These requirements will be reviewed on a case-by-case basis.

O. INSTALLATION OF BEDDING MATERIAL

(1) After completion of the trench excavation and proper preparation of the foundation, bedding material shall be placed in the trench for pipe support in the limits indicated on Detail 100-03, “Wet Utility Trench”. Bell holes shall be dug deep enough to provide a minimum of two (2) inches of clearance between the bell and bedding material. All pipes shall be installed in such a manner as to ensure full support of the pipe barrel over its entire length. After the pipe is adjusted for line and grade, and the joint is made, the bedding material shall be carefully placed and compacted uniformly under the haunches of the pipe in the previously dug bell holes and on each side of the pipe to prevent settlement or lateral displacement. The bedding material shall be compacted by vibrating, rodding, or slicing with a shovel.

(2) Bedding is required on all service lines. A layer of geotextile material shall be installed around the bedding material whenever the results of the soil testing of the native material, in the opinion of the City Engineer, result in the migration of the bedding material into voids in the existing trench bottom.

P. TRENCH BACKFILL

(1) Trench backfill consists of the backfill above the bedding zone and below the base course as indicated in Detail 100-03, “Wet Utility Trench Construction”.

(2) Unless approved by the City Engineer, or unless specified for hydrostatic test purposes, all trenches and excavations shall be backfilled within the same day after the pipe is laid therein, but not before the pipe has been inspected by the City Inspector. The length of open trench shall be approved by the City Engineer on a case-by-case basis. Unless otherwise approved by the City Engineer, cleanup shall be performed after a maximum of six hundred (600) linear feet of pipe installation. No trench shall be left open overnight without proper protection and approval of the City Engineer. These requirements apply for all mains and service lines. Backfilling of trenches shall comply with these City Standards, and with applicable design and soils reports.

Q. BACKFILLING IN FREEZING WEATHER

Backfilling shall not be done in freezing weather, except by permission of the City Engineer, and it shall not be done with frozen material. No backfill shall be placed when the material in the trench is frozen.

R. COMPACTION REQUIREMENTS AND TESTING

(1) It is the responsibility of the Contractor to provide the proper means and equipment for obtaining compaction within the specified ranges. If the City Engineer determines that the means or equipment is not adequate to obtain the desired results, the City Engineer may require specific measures to ensure the desired results. One such measure may be the use of non-shrinkable Flow-Fill for trench backfill.

(2) The Contractor shall retain a private, approved testing agency regularly involved in soils testing to perform required Proctor and compaction tests at the Contractor's expense. Two copies of all Proctor curves and test results showing the exact location of sample collection and test sites shall be furnished

to the City Engineer for approval. Only actual test information shall be submitted, estimated values will not be accepted. The City Engineer shall be informed before any tests are performed and may designate areas to have checked for compaction. The results of the tests shall be given to the City Engineer before any compaction is accepted.

a. Standard Proctor Tests (ASTM D698): The Contractor shall provide Standard Proctor results to develop compaction testing parameters for backfill. A sufficient number of Proctor tests shall be taken so as to, in the determination of the City Engineer, adequately represent all types of soil encountered along the trench. Said tests are intended only to aid the verification of the quality of the work.
b. Field Density Tests: The Contractor shall provide field compaction tests conforming to ASTM D2922 and D3017 for every one (1) foot of trench over two hundred (200) lineal feet of pipe installation unless otherwise specified by the City Engineer. The Contractor shall provide one field compaction test per every one hundred (100) lineal feet of sidewalk and shall demonstrate that the subgrade passes a wheel test. The Contractor shall provide two field compaction tests for each water and sewer service line. For the sewer service, the tests shall be required at varying depths per the direction of the City Inspector and shall be located a minimum of ten (10) feet from the end of the service line. For the water service, the test shall be taken when the fill is at a level of two (2) feet below the final grade; one test shall be located five (5) feet from the water main and one test shall be located two (2) feet from the curb stop (between the curb stop and the sidewalk). The Contractor may be required to dig up portions of the trench to afford access for compaction tests below the top surface of the backfill material. Acceptable field compaction test results shall not relieve the Contractor from correction or repair of any substandard work before or during warranty period.

(3) Unless otherwise required on the plans, or by the City Engineer to prevent settlement or damage to existing or proposed public or private improvements, trench backfill compaction shall be to the following minimum densities indicated below:

a. All compaction shall be 95% of Standard Proctor, unless otherwise required by the City Engineer.
b. No ponding or jetting of trenches, use of a hydrohammer, or any impact type compaction is allowed. Compaction shall be done by mechanical methods.
c. All material shall be compacted within plus or minus two percent (2%) of the optimum moisture content as determine by the Standard Proctor Test. The Contractor shall be responsible for providing a stable non-pumping subgrade. If any portion of the subgrade is suspected of not being stable, the City Engineer may require that the subgrade be proof rolled. Proof rolling shall be performed with equipment and in a manner acceptable to the City Inspector. The Contractor shall provide any equipment required for proof rolling. Areas which fail shall be corrected and brought into compliance with City Standards by the Contractor.
d. If the required compaction is not obtained, it shall be the responsibility of the Contractor to re-compact the material. In cases where there is a failure to achieve the required compaction, the City Engineer may require that the backfill be removed and replaced with City approved backfill material. Any utilities within the trench that were tested prior to re-compaction shall be retested per the direction of the City Inspector after re-compaction.

S. ASPHALT & CONCRETE PATCHING

Surface material patch-back for trenches shall be consistent with the surface material removed prior to trenching i.e. asphalt or concrete and in accordance with Detail 100-06 “Typical Asphalt and Concrete Trench Patch-Back". Asphalt shall be patched back to a minimum thickness of eight (8) inches or to the

existing full depth thickness if greater. Concrete pavement patching shall be patched back to a minimum thickness of ten (10) inches, unless the existing thickness is greater, and be in accordance with Detail 100-05, “Concrete Pavement Patch-Back". The detail is not to be used for existing concrete panels that are less than eight (8) inches thick. Refer to the City Standards Section 200, Transportation, for additional information on asphalt and concrete patching.

T. UTILITY MARKER POST

When utility Appurtenances are installed where adequate physical reference points are not available or utility is located in a position where it requires additional protection, a utility marker post may be required to be installed per Detail 100-10, “Marker Post”. Flexible utility marker posts may be considered with approval from the City Engineer.

U. TRACING FOR UTILITY LOCATION

All City-owned sewer and water infrastructure, as well as any private or public utility, located in City ROW shall be electronically locatable. Refer to CRS 18-167 for locating requirements. Other utilities may be required to be electronically locatable at the discretion of the City Engineer.

(1) TRACING WIRE

All City-owned sewer and water infrastructure without joint bonding and non-metallic service lines, shall be installed with tracing wire. All new tracer wire installations and connections to existing shall be located using typical low-frequency (512 Hz) line tracing equipment, witnessed by the contractor, inspector, and city staff prior to acceptance, and shall be performed upon completion of rough grading and prior to final acceptance. Lines shall trace in every direction continuously from each trace location; tracing from one location is required to trace in all directions without having to connect in a different location. Continuity testing in lieu of actual line tracing shall not be accepted. Connections to existing systems shall be traceable to meet existing tracer configuration and shall connect to existing tracer wiring.

(2) TRACER WIRE & INSULATION

a. The tracing wire shall be a minimum 12 AWG solid copper wire with a High-Density Polyethylene (HDPE) or High-Molecular-Weight Polyethylene (HMWPE) coating, designated for direct burial, and shall be color-coded per APWA standards. Open trench or open cut installations shall have wire that has a minimum 450 lb. break load and a minimum 30 mil insulation. Directional drilling or boring installations shall have a minimum break load of 1,150 lb. with a minimum insulation thickness of 45 mil.

Table 1-2 Trace Wire Insulation Colors

Color	**Utility Line**
Red	Electric
Yellow	Gas
Orange	Communication
Blue	Potable Water
Purple	Non-potable Water, Storm
Green	Sanitary

b. All connectors used to connect tracing wire shall rated specifically for use in underground tracer wire installation. Wire splices shall be connected in a UL Standard 486D-approved

splice kit for use in wet, damp, direct-bury locations. Connectors shall be dielectric silicone-filled to seal out moisture and corrosion and shall be installed in a manner that prevents any uninsulated wire exposure. Non-locking, friction-fit, wire nut, or taped connectors are prohibited.

c. All trace wire shall be interconnected, including at all tees, crosses, valves, manholes, sewer laterals, etc. For open trench or open cut installations, the tracing wire shall be secured to the top of the pipe with a pipe-wrapping tape that adheres to metal and plastic and is approved for direct bury at intervals not to exceed five (5) feet.
d. Tracer wire shall be properly grounded at all dead-ends/stubs using 1.5 lbs drive-in magnesium ground rods specifically designed for this purpose. Dead-ends include hydrants, service laterals, and fire lines. When grounding the tracer wire at dead-ends/stubs, the Ground Rod shall be driven into virgin soil directly beneath and in line with the utility.
e. Tracer wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512 Hz) signal, and distortion of signal caused by more than one wire being installed in close proximity to one another.
f. Tracer wire systems shall be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed.
g. Any damage occurring during installation of the tracer wire shall be immediately repaired by removing the damaged wire and installing a new section of wire with approved connectors. Taping and/or spray coating shall not be allowed.
h. Mainline tracer wire shall not be connected to existing conductive pipes; it shall be treated as a mainline dead-end ground using an approved waterproof connector to a Ground Rod driven into virgin soil beneath and in line with the utility.
i. All service lateral tracer wire shall be a single wire, connected to the mainline tracer wire.
j. Where an existing tracer wire is encountered on an existing utility that is being extended or tied into, the new tracer wire and existing tracer wire shall be connected using approved connectors.
k. Tracer wire on all service laterals/stubs shall terminate at an approved tracer wire access point located directly above the utility, at the edge of the road right-of-way, but out of the roadway.
l. Twenty-four (24) inches of excess/slack wire is required in all tracer wire access points after meeting the final elevation.

(3) SANITARY SEWER SYSTEM

a. A mainline tracer wire shall be installed, with all service lateral tracer wires properly connected to the mainline tracer wire, to promote tracing/locating capabilities from a single connection point.
b. Mainline tracer wire shall be laid continuously, by-passing around the outside of manholes/structures on the north or east side.
c. Tracer wire on all sanitary service laterals shall terminate at an approved tracer wire access point, color coded green and located directly above the service lateral at the edge of the road right-of-way.

(4) WATER SYSTEM

a. A mainline tracer wire shall be installed, with all service lateral tracer wires properly connected to the mainline tracer wire, to promote tracing/locating capabilities from a single connection point.

b. Lay mainline tracer wire continuously, by-passing around the outside of valves and fittings on the north or east side.
c. A single tracer wire only shall be installed on all water service laterals and shall terminate at an approved tracer wire access point, color coded blue, and located directly above the service lateral at the edge of the road right-of-way.
d. Tracer wire access points will be installed at all fire hydrants. Tracing wire shall be brought to grade at all fire hydrants and designated locations in an approved test box. Test boxes shall have a lid with a terminal for direct connection to the tracer wire, a locking cover, and a cast-iron collar.

(5) STORM SEWER SYSTEM

a. If the storm sewer system includes service laterals for connection of private drains and tile lines, it shall be specified the same as a sanitary sewer application.
b. Mainline tracer wire must be laid continuously, by-passing around the outside of manholes/structures on the north or east side.

(6) WARNING TAPE

All utilities shall have a utility warning tape installed in the trench eighteen (18) to twenty-four (24) inches above the crown of the pipe. The warning tape shall be a six (6) inch wide, detectable, aluminum-foil-plastic-backed tape. The tape shall be APWA color coded (see table below) with a repeating warning message indicating that a utility is located below the tape.

Table 1-3 Warning Tape Colors to Utility Type

Color	**Utility Line**
Red	Electric
Yellow	Gas
Orange	Communication
Blue	Potable Water
Purple	Non-potable Water
Green	Sanitary
Green	Storm

(7) ELECTRONIC MARKER SYSTEM

For water mains, a buried, electronic marker shall be installed directly above all horizontal and vertical bends and casing pipe ends between two (2) and three (3) feet below the surface. The electronic marker shall be capable of receiving a signal from the manufacturer's locator and returning a signal with a unique serial number and accurately indicating the marker's horizontal position. Electronic markers shall be installed per manufacturer specifications. One electronic marker shall be installed directly above any fitting with a vertical bend and at each end of a casing. The marker shall be positioned two (2) to three (3) feet below the surface. The GPS coordinates of the marker must be submitted to the City Engineer.