**PART 1 – GENERAL**

* 1. **SUMMARY**
1. Section Includes:
2. Layout of the work
3. Verification of work
	1. OWNER reserves the right to verify any work that Project Inspector (PI) deems necessary.
	2. Other sections that require Surveyor to verify or measure installed work and related item. Surveyor shall perform such verifications or measurements at CONTRACTOR’S expense. CONTRACTOR shall furnish a certification, signed by both Surveyor and CONTRACTOR to PI.
4. Related Sections:
5. Section 01 11 00: Summary of Work
6. Section 01 31 13: Project Coordination
7. Section 01 33 00: Submittals
8. Section 01 32 13: Construction Project Schedule
9. Section 01 77 00: Contract Closeout
	1. **SURVEY CONTROLS**
10. Vertical Control shall use same benchmark used in the preparation of topographic survey. When Work consists of both on-site and off-site and benchmarks differ, an equation shall be indicated on Drawings.
11. Horizontal control for existing structures shall be the property line.
	1. **LAYOUT OF WORK**
12. All work related to staking shall be by a Land Surveyor, or Civil engineer, currently registered with the State of California to perform land surveying and employed by the CONTRACTOR.
13. Before commencement of Work, surveyor shall locate all reference points and benchmarks to be used for vertical and horizontal control.
14. Surveyor shall lay out entire Work, set grades, lines, levels, control points, elevations, grids and positions.
	1. **RECORD DOCUMENTS**
15. Maintain complete and accurate log of all control and survey documentation as work progresses.
16. Record, by coordinates, all utilities onsite with top of pipe elevations, at major grade and alignment changes, rim, grate or top of curb and flow line elevations of all drainage structures and sewer manholes.
17. Indicate reference and control points on record drawings. The basis of elevation shall be one of the established benchmarks.
18. Upon Substantial Completion, obtain and pay for reproducible plan. Deliver plans to OAR and/or FUSD. Clearly indicate all differences between original drawings and completed work within specified tolerances.

**1.05** **SUBMITTALS:**

A. Surveyor: Shall submit name, address and license number to OWNER, including any changes as they occur.

B. Field notes: Upon request by OAR, submit copies of cut sheets, coordinate plots, data collector printouts, marked-up construction staking plans and other documentation as available to verify accuracy of field engineering work during and at completion of project. Submittals to OWNER must be signed and sealed by Surveyor and counter-signed by CONTRACTOR.

C. Statement of Compliance: CONTRACTOR shall submit a statement of certification signed and sealed by Surveyor, counter-signed by CONTRACTOR indicating compliance with grades and alignment of construction plans at rough grade, fine grade and top of rock stages. PI shall approve survey submittals for each stage of construction prior to proceeding with work.

D. Upon Substantial Completion, CONTRACTOR shall obtain and pay for reproducible survey drawings (or “As Built”).

E. Completed record drawings shall be signed and certified as correct and within specified tolerances by licensed surveyor. Originals and 2 sets of blueprints shall be submitted to OWNER.

**PART 2 – PRODUCTS** (Not Used)

**PART 3 - EXECUTION**

**3.01** **PREPARATION**

A. Pre-mark areas of excavation in accordance with the requirements of “Dig-Alert”. Request locators 2 days before commencing excavation.

B. Before commencing Work, establish all horizontal and vertical reference points used in Contract Documents according to existing field conditions.

C. Preserve established reference lines and benchmarks.

D. Differentiate school and city datum as applicable.

E. Relocate benchmarks that may interfere with Work.

F. Reset and re-establish reference marks damaged or lost during construction.

**3.02 SURVEY REQUIREMENTS GENERAL**

A. Establish a minimum of two permanent horizontal and vertical control points on Project site, remote from construction area, referenced to data established by control points.

B. Indicate reference points, relative to benchmark elevation on record drawings.

C. Provide grade stakes and elevations to construct over excavation and re-compaction, rough and final grades, paved areas, curbs, gutters, sidewalks, building pads, landscaped areas, and other areas as required.

D. Calculate and layout proposed finished elevations and intermediate controls as required to provide smooth transitions between spot elevations indicated on Drawings.

E. Provide stakes and elevations for grading, fill, and topsoil placement.

F. Provide adequate horizontal and vertical control to locate utility lines, including but not limited to, storm, sewers, water mains, gas, electric and signal and provide vertical control in proportion to the slope of the line as required for accurate construction. Dry utilities will be based upon adequate horizontal and vertical control layout. Prior to trench closure, survey, and record invert and flow line elevations. Survey and record top of curb and flow line elevations on finished concrete or asphaltic concrete (AC) surfaces at key locations such as beginning-of-curve (BC), end-of-curve (EC), grade breaks, corners or angle points in sufficient number to demonstrate the Work complies with the intent of the Contract Documents.

G. Provide horizontal and vertical control for batter boards for drainage, utility, and other on-site structures as required.

H. Furnish building corner offsets as required to adequately locate building pads. Provide cut and full stakes within the building pad perimeter adequate to control both over excavation and re-compaction and the final sub-grade elevation of the building pad.

I. Submit a certification signed by the surveyor confirming the elevations and locations of improvements are in conformance with the Contract Documents. The statement shall include survey notes for the finish floor and building pad, showing the actual measured elevations on the completed sub-grade, recorded to the nearest 0.01’. Building pad tolerance will be ±0.10’.

J. Establish a minimum of two permanent horizontal and vertical control points on Project site, remote from building area, referenced to data established by survey control points.

K. Mark boundaries for rights-of-way dedications and easements for utilities prior to making location of buildings and utilities.

L. Layout all lines, elevations and measurements needed for construction or installation of buildings, grading, paving utilities according to the following:

 1. Identify site boundary, property lines

 2. Provide working benchmarks

 3. Set stakes for Bottom of Excavated Plane (B.E.P.)

 4. Set gridlines, radii, working points etc., for foundation

 5. Set and verify building pad elevations

 6. Set finish floor elevations

 7. Stake location and elevations for exterior ramps and stairs

8. Set gridlines, radii, working points, etc., for all floors of multi-story buildings

9. Set storm drain and sanitary sewer inverts and other utilities as needed at 5’ off-set from building lines

10. For new facilities, establish permanent onsite Benchmark with 2” diameter brass disk. Location of Benchmark to be determined by OWNER

**3.03 SURVEY REQUIREMENTS FOR GRADING**

A. Provide grade stakes and elevations as follows:

 1. Removal limits (cut lines)

2. Rough grade staking: 60’ maximum grid plus additional stakes at grade changes and pertinent locations. Flag all grade changes including ridges, flow lines and grade breaks.

3. Fine grade for top of dirt: 30’ maximum grid plus additional stakes at grade changes and pertinent locations. Flag all grade changes including ridges, flow lines and grade breaks.

4. Verify fine grade for top of rock: 30’ maximum grid plus additional stakes at grade changes and pertinent locations. Flag all grade changes including ridges, flow lines and grade breaks.

5. Finish grade marks on all buildings, structures and at pertinent locations.

6. Finish grades and offsets for all concrete work, utilities, landscape areas, and structures.

7. Provide controls and baselines for playground striping.

8. Offsite improvements: set grades and provide grade sheets as required by local authorities.

B. Provide a minimum of two permanent horizontal and vertical control points onsite, remote from building area, referenced to data established by survey control points.

**3.04 SURVEY REQUIREMENTS FOR UTILITIES**

A. Locate “wet” utility lines and provide vertical control proportionate to slope of line as required for accurate construction. “Dry” utilities shall have adequate horizontal and vertical control layout supplied by others.

B. Prior to back-filling trench, survey and record invert and flow line elevations. Survey and record top of curb and flow line elevations on finished surfaces at key locations (such as Back of Curbs, grade breaks, corners or angle points) in sufficient number to demonstrate Work complies with intent of Contract Documents.

C. Provide horizontal and vertical control for batter boards for drainage, utility, and other on-site structures as required.

1. Set grades for vaults one inch higher than adjacent surrounding design grades, unless noted otherwise.

D. Leave all trenches open until required inspection is completed.

**3.05 SURVEY REQUIREMENTS FOR STRUCTURES**

A. Furnish building corner offsets as required to adequately locate buildings pads. Provide cut and fill stakes within building pad perimeter adequate to control both over excavation and re-compaction and final sub-grade elevation of building pad.

B. Submit a certification signed by surveyor confirming elevations and location of improvements are in conformance with Contract Documents. Statement shall include survey notes for finish floor and building pad, showing actual measured elevations on completed sub-grade, recorded to nearest 0.01’. Building pad tolerance will be ± 0.10’.

**END OF SECTION**