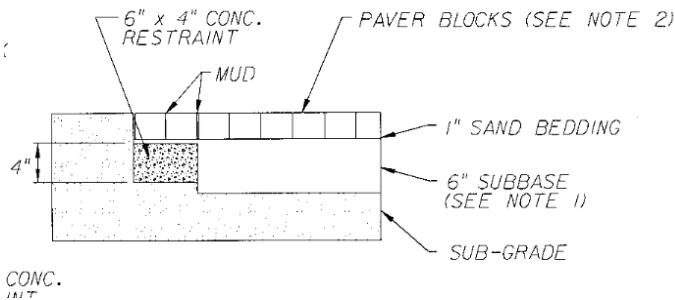


StoneHardscapes, founded in 2001, is the first manufacturer and importer of travertine and marble pavers in the United States. Our goal is to assist our clients in a successful installation process which in turns creates the ultimate level of satisfaction for their clients.

The natural stone pavement structure is commonly used for both pedestrian and vehicular applications. Pedestrian areas, driveways, and areas subject to nonvehicular use are paved with units 1.25" or 3 cm thick for most StoneHardscapes natural stone options.

Streets and industrial pavements should be paved with units at least 2.25" or 5cm thick for most StoneHardscapes natural stone options. For residential properties 3 cm thick material that is 6"x12" or smaller in surface area may be used for non-commercial vehicular traffic with a required minimum 6" rock subbase. It is important to understand there are natural veins and fissures inherent to natural stone that may crack or break over time even though the average PSI of natural stone is far greater than that of a concrete brick pavers.



StoneHardscapes
 Travertine & Marble
 Residential Driveway

Compaction of the soil subgrade and aggregate base materials are essential to the long-term performance of interlocking concrete pavements.

Installation steps typically include job planning, layout, excavating and compacting the soil subgrade, applying geotextiles (optional), spreading and compacting the sub-base and/or base aggregates, constructing edge, restraints, placing and screeding the bedding sand, placing natural stone pavers, compacting natural stone pavers, sweeping in jointing sand and final compaction.

Note 1 – Minimum 6" compacted lime rock

Note 2 – Travertine or Marble pavers at a 3cm thickness must not exceed a surface area of 6"x12" for non-commercial vehicular traffic

Note 3 – The concrete restraint should cover the full length and width of the stone being adhered to it. The above referenced 6" width is referencing a 6"x12" paver being laid on the 6" side. If a 6"x12" paver is laid on the 12" side the concrete restraint should be 12" wide.

Installation Basics

Note: Compaction of the soil subgrade is recommended to at least 98% standard Proctor density per ASTM D 698 for pedestrian areas and residential driveways. Compaction to at least 98% modified Proctor density per ASTM D 1557 is recommended for areas subject to heavy vehicular traffic. Stabilization of the subgrade and/or base material may be necessary with weak or saturated subgrade soils.

Note: Local aggregate base materials typical to those used for highway flexible pavements are recommended, or those conforming to ASTM D 2940. Compaction of aggregate is recommended to not less than 98% Proctor density in accordance with ASTM D 698 is recommended for pedestrian areas and residential driveways. 98% modified Proctor density according to ASTM D 1557 is recommended for

vehicular areas. Mechanical tampers are recommended for compaction of soil subgrade and aggregate base in areas not accessible to large compaction equipment. Such areas can include those around lamp standards, utility structures, building edges, curbs, tree wells and other protrusions.

Note: Prior to screening the bedding sand, the recommended base surface tolerance should be $\pm 3/8$ in. (± 10 mm) over a 10 ft. (3 m) straight edge.

Note: The elevations and surface tolerance of the base determine the final surface elevations. The paver installation contractor cannot correct deficiencies in the base surface with additional bedding sand or by other means. Therefore, the surface elevations of the base should be checked and accepted by the General Contractor or designated party, with written certification to the paving subcontractor, prior to placing bedding sand and pavers.

Acceptance of Site Verification of Conditions:

General Contractor shall inspect, accept and certify in writing to the paver installation subcontractor that site conditions meet specifications for the following items prior to installation of natural stone pavers.

- Verify that subgrade preparation, compacted density and elevations conform to specified requirements.
- Verify that geotextiles, if applicable, have been placed according to drawings and specifications.
- Verify that Aggregate, Cement-treated, Asphalt-treated, Concrete, Asphalt, base materials, thickness, compacted density, surface tolerances and elevations conform to specified requirements.
- Provide written density test results for soil subgrade, aggregate, cement-treated, asphalt-treated, asphalt base materials to the Owner, General Contractor and paver installation subcontractor.
- Verify location, type, and elevations of edge restraints, concrete collars around utility structures, and drainage inlets.

Do not proceed with installation of bedding sand and pavers until [subgrade soil and] base conditions are corrected by the General Contractor or designated subcontractor.

PREPARATION

1. Verify base is dry, certified by General Contractor as meeting material, installation and grade specifications.
2. Verify that base [and geotextile] is ready to support sand, [edge restraints,] and, pavers and imposed loads.
3. Edge Restraint Preparation
 - a. Install edge restraints per the drawings [and manufacturer's recommendations] at the indicated elevations.

Note: Retain the following two subparagraphs if specifying edge restraints that are staked into the base with spikes.

- a. Mount directly to finished base. Do not install on bedding sand.
- b. The minimum distance from the outside edge of the base to the spikes shall be equal to the thickness of the base.

INSTALLATION

1. Spread bedding sand evenly over the base course and screed to a nominal 1 in. (25 mm) thickness, not exceeding 1 1/2 in. (40 mm) thickness. Spread bedding sand evenly over the base course and screed rails, using the rails and/or edge restraints to produce a nominal 1 in. (25 mm) thickness, allowing for specified variation in the base surface. Bedding sand should be non-recycled gunite sand. Recycled sand can create an adverse reaction with the stone.
 - a. Do not disturb screeded sand.
 - b. Screeded area shall not substantially exceed that which is covered by pavers in one day
 - c. Do not use bedding sand to fill depressions in the base surface.

Note: When initially placed on the bedding sand, manually installed pavers often touch each other, or their spacer bars if present. Joint widths and lines (bond lines) are straightened and aligned to specifications with rubber hammers and pry bars as paving proceeds.

2. Lay pavers in pattern(s) shown on drawings. Place units hand tight without using hammers. Make horizontal adjustments to placement of laid pavers with rubber hammers and pry bars as required.

Note: Contact manufacturer of interlocking concrete paver units for recommended joint widths.

3. No joint is required when installing StoneHardscapes natural stone pavers.
4. No joint bond lines are required when installing StoneHardscapes natural stone pavers.
5. Fill gaps at the edges of the paved area with cut pavers or edge units.
6. Cut pavers to be placed along the edge with a diamond blade on a wet saw.

Note. Specify requirements for edge treatment in paragraph below.

7. Adjust bond pattern at pavement edges such that cutting of edge pavers is minimized. All cut pavers exposed to vehicular tires shall be no smaller than one-third of a whole paver. Cut pavers at edges as indicated on the drawings.
8. Keep skid steer and forklift equipment off newly laid pavers that have not received initial compaction and joint sand.
9. Use a low-amplitude plate compactor capable of at least a minimum of 4,000 lbf (18 kN) at a frequency of 25 to 50 Hz with a piece of cardboard and carpet strapped to the plate to vibrate the pavers into the sand. Always test the compactor in a small area and adjust frequency as required to avoid excessive cracking or breaking. Alternatively a rubber mallet can be used to adjust pavers into place. Remove any cracked or damaged pavers and replace with new units.
10. Simultaneously spread and sweep dry joint sand into joints continuously until full. This will require at least 4 to 6 passes.
11. Cover the laying face or any incomplete areas with plastic sheets overnight to prevent exposed bedding sand from becoming saturated from rainfall.
12. Remove excess sand from surface when installation is complete.

Note: Excess joint sand can remain on surface of pavers to aid in protecting their surface especially when additional construction occurs after their installation. If this is the case, delete the article above and use the article below. Designate person responsible for directing timing of removal of excess joint sand.

13. Allow excess joint sand to remain on surface to protect pavers from damage from other trades. Remove excess sand when directed by [Architect].
14. Surface shall be broom cleaned after removal of excess joint sand.

FIELD QUALITY CONTROL

1. The final surface tolerance from grade elevations shall not deviate more than $\pm 3/8$ in. (± 10 mm) under a 10 ft (3 m) straightedge.
2. Check final surface elevations for conformance to drawings.

Note: For installations on a compacted aggregate base and soil subgrade, the top surface of the pavers may be 1/8 to 1/4 in. (3 to 6 mm) above the final elevations after compaction. This helps compensate for possible minor settling normal to pavements.

3. The surface elevation of pavers shall be 1/8 in. to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.

Note: For pedestrian access routes maximum elevation should not exceed 1/4 in. (6 mm).

4. Lippage: No greater than 1/8 in. (3 mm) difference in height between adjacent pavers.

Note: Cleaning and sealing may be required for some applications. DO NOT, UNDER ANY CIRCUMSTANCES, USE ACID IN ANY FORM OR MIXTURE TO CLEAN OR PRESSURE WASH THE STONE.

CLEANING, SEALING, JOINT SAND STABILIZATION

1. Clean and seal StoneHardscapes natural stone pavers in accordance with our written care and maintenance recommendations.
2. Joint stabilization sand is not recommended as the joints for natural stone are not significant nor consistent

PROTECTION

1. After work in this section is complete, the General Contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site.