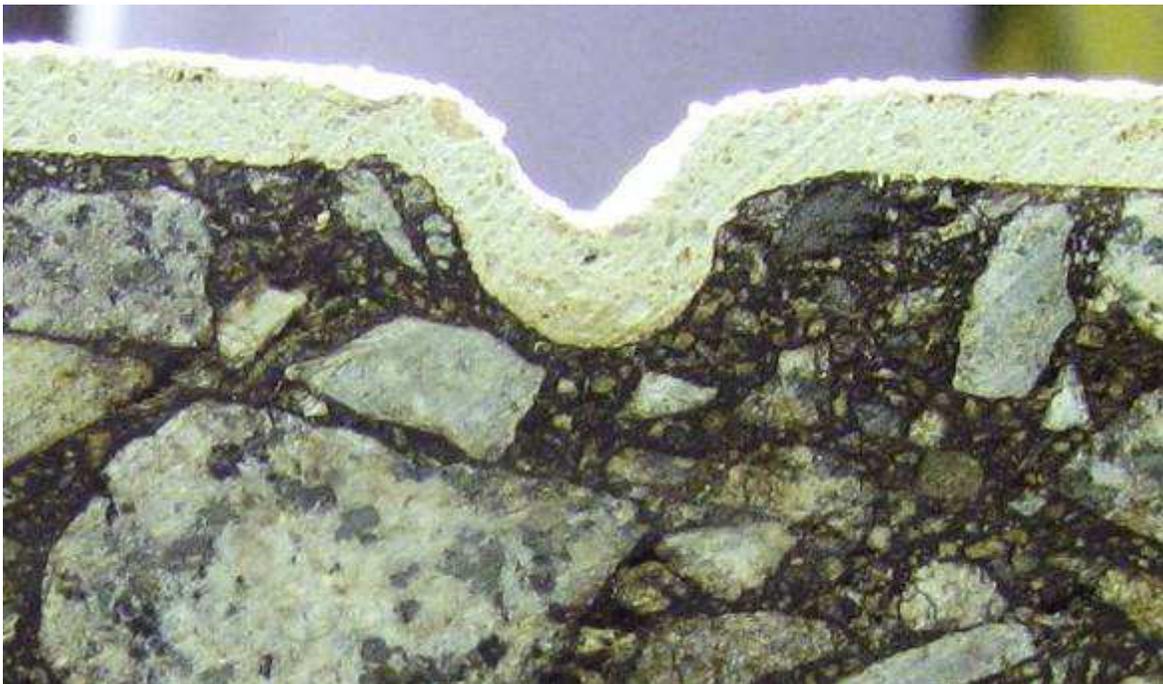


## TrafficPatternsXD™ Substrate Guide

Evaluating existing pavements plus  
removal and replacement best practices



# TrafficPatternsXD™ Substrate Guide - Overview

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TrafficPatternsXD™ is a topical treatment applied to an existing asphalt pavement substrate. A properly installed asphalt pavement, designed for stability in its intended use, is a key factor in producing a long lasting, quality TrafficPatternsXD™ application.

- Asphalt pavement installation should be done in proper climatic conditions and following correct installation procedures.
- Asphalt should always be installed with a suitable paving machine and should be compacted at the proper temperature using an appropriate sized roller.
- Asphalt mix designs are engineered differently, dependent upon intended use, traffic volumes, traffic type and environment. The mix design to be used for TrafficPatternsXD™ should always be the one designed for the intended use.

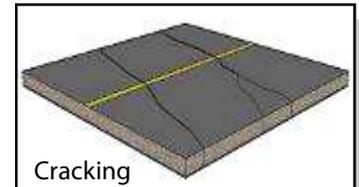
This guide is meant to discuss and make recommendations on:

1. Assessing an existing asphalt substrate
  1. Defects
  2. Surface Contamination
2. Removal and Replacement (if existing substrate is not acceptable)
  1. Single crosswalk mill and fill
  2. Full intersection mill and fill

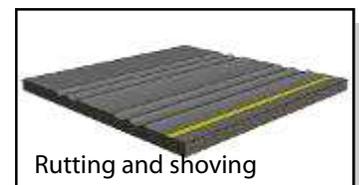
# 1.1 Assessing an existing asphalt substrate - Defects

Asphalt pavement showing the following conditions should be avoided, as it will affect TrafficPatternsXD™. Asphalt pavements over 5 years should not be considered.

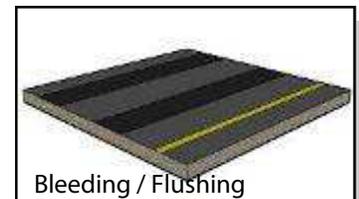
Cracking. Cracking occurs due to shrinkage of the subgrade or asphalt pavement, or excessive bending of the pavement surface. Cracks found in the asphalt will eventually reflect through TrafficPatternsXD™.



Rutting. A depression of the pavement in the wheel path. It is a structural failure due to excessive loading of that pavement.

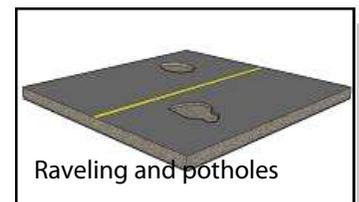


Shoving. Localized ripples in the asphalt surface sometimes referred to as “corrugations” or “washboarding”. It is a sign of an unstable asphalt substrate.



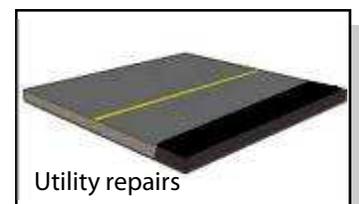
Bleeding / Flushing. Through the action of vehicle tires, heat and migration of excessive asphalt cement (AC) to the surface. Surface texture becomes filled with liquid AC, which can leach through TrafficPatternsXD™ upon application. May indicate an excessive amount of AC in the mix.

Raveling. Loss of aggregate from the surface as a result of poor installation and/or lack of AC in the mix. It will appear as a rough texture on the pavement surface as aggregates pop out.



Potholes. Severe pavement fatigue cracking, which results in a total loss of asphalt pavement in a localized area, creating a hole in the road.

Utility repairs. Asphalt patching made when repairing underground utilities. Most repairs are not installed to meet the asphalt stability requirements needed for TrafficPatternsXD™, and can lead to cracking on saw cuts and pattern distortion.



The above examples are the most common examples of defects that would result in an existing pavement to be deemed unsuitable. There may be other issues that are not listed above, so it is recommended to always inspect every site in advance and use a good measure of common sense.

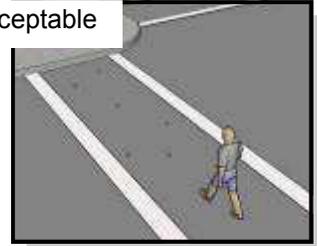
# 1.2 Assessing an existing asphalt substrate - Surface Contaminants

## Vehicle Fluids

Minor amounts of oil droplets (up to 10 small spots less than 2 inches in diameter per 300 sq ft) are acceptable and should be evaporated away during the heating process. If small spots are more frequent, power washing should be considered.

If larger areas are contaminated by oil, then they must be removed by power washing. If the oil is soaked in and cannot be washed away then the pavement must be removed and replaced.

Acceptable



Cleaning necessary



## Line Markings

Surfaces where line markings, such as thermoplastics and traffic paint, have been used should be avoided. TrafficPatternsXD™ is meant to be applied directly to the asphalt surface. If the surface is contaminated with markings they can affect the melting, bonding and stamping process of TrafficPatternsXD™. Unfortunately, removal of these markings can compromise the strength of the asphalt surface, which can lead to a weakened surface and the asphalt separating from itself. Avoid surfaces where line markings have been used.



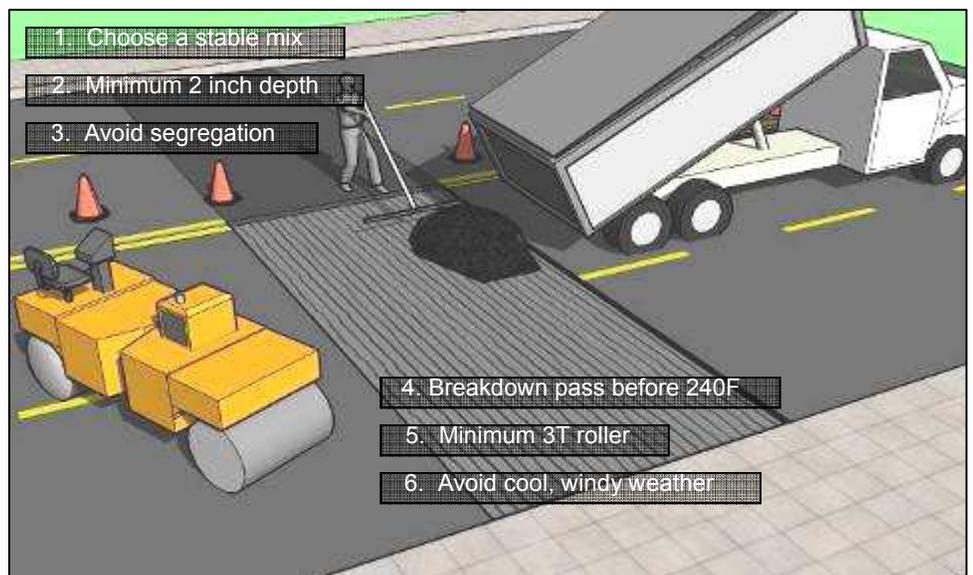
Avoid surfaces containing line markings

## 2.1 Removal and replacement – Single crosswalk

When existing pavements are deemed unsuitable for TrafficPatternsXD™, they must be removed and replaced with new pavement. The milled out area is often too small to use a paving machine and must be paved with a shovel and asphalt rake (“hand work”). There are certain challenges in achieving quality hand work:

1. Asphalt Mix Design: Must be of suitable design for the traffic load, but also have the workability required for hand work. Mixes with a nominal (largest) aggregate size greater than 1/2 inch should not be used as they will segregate when placed by hand. It is best to check with local consulting engineers if you are not sure of the mix to use in your area.
2. Mill and fill depth = 2 inch minimum: Asphalt will cool quicker if less material is placed. Lack of compaction and pavement failure will result if less than two inches of asphalt is used.
3. Segregation: Larger stone becomes separated from smaller aggregates, resulting in a concentration of large aggregate or sand in one area of the mat that can lead to raveling. This segregation most commonly occurs during the raking process by:
  - over working (raking too much) the asphalt mix.
  - casting rocks brought to the surface back onto the mat prior to rolling.
4. Compaction Temperature: It is critical that the first roller pass (breakdown) occurs before any portion of the hand laid pavement cools below 240F. Cooler breakdown temperatures can result in poor asphalt compaction and pattern fade.
5. Rolling: The roller used must be at least in the 3 to 5 ton range with vibratory capability. Be careful not to let any area of the placed mix cool below 240F prior to the first rolling pass.

6. Cold weather paving:  
When paving in cooler temperatures, especially in the fall, one must be even more careful when placing pavement by hand. Ambient temperature should always be 50F and rising. Avoid cool, windy weather, especially in the fall.



## 2.2 Removal and replacement – Full intersection

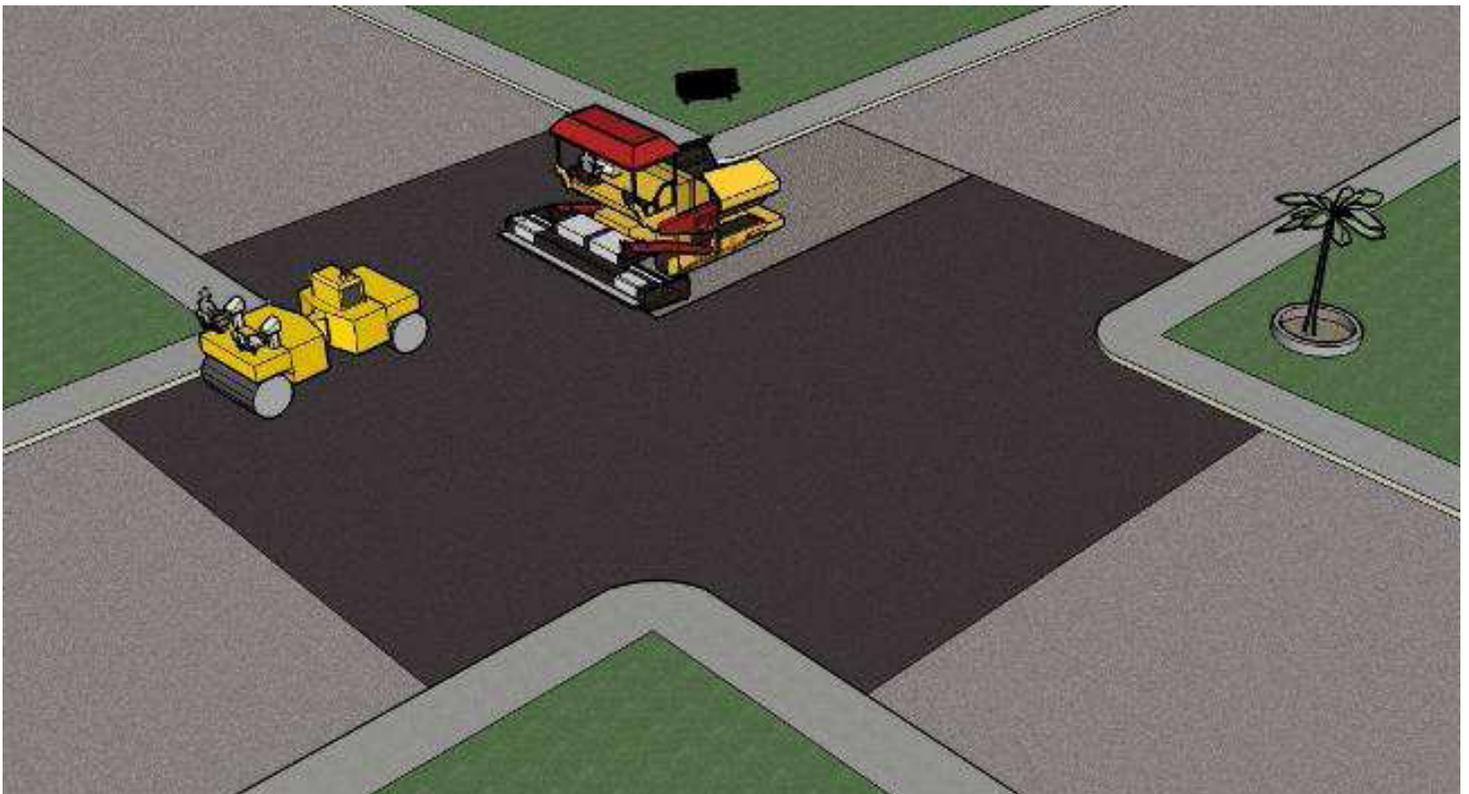
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When existing pavement found in multiple crosswalks of an intersection are deemed not unsuitable for TrafficPatternsXD™, the full intersection can be replaced, rather than individual crossings.

Rather than focusing on just the crosswalks, the entire intersection can be removed and replaced using a large milling and paving machine. Due to the use of large paving machines, a higher and more consistent level of pavement quality can be achieved.

The existing asphalt pavement on the adjoining streets can be repaved at a later time with no disruption to the intersection and crosswalks.

Another reason this strategy works well is that intersections often need treatment sooner than the rest of the street, due to traffic turning, stopping and starting.



The full intersection mill and fill allows for proper equipment to be used, which delivers a higher quality asphalt.