LITHIFIED Technologies™

*Sustainable Solutions for the Earth's Most Challenging Problems*

# Lithification – Nature Turning Soil into Stone Over Thousands of Years

A process involving naturally occurring minerals, in which sediments compact under pressure, expel connate fluids, creating porosity destruction through compaction and cementation, which gradually become solid rock over thousands of years.

# LithTec's - Accelerated Lithification Turns Soil into Stone in 24 to 48 hours

A process involving LithTec™, moisture, and pressure that combine to form complex aluminosilicates, thereby turning road materials into a stone-like structure in 24 hours.

*"**LithTec™** Is one of the Most Significant GeoTechnical Advancements in Soil Sciences." Dr. Gilles Bussod LANL Scientist*

# About LithTec™

# The Product

- The Lithtec™ customized formulations are a unique combination of High Strength and High Ductility.
- LithTec™ is blended regionally across the US and available for shipment in 1 or 2-ton supersacks or shipped in pneumatic trucks.
- LithTec™ is laboratory tested and customized for every project, to optimize the performance in each material being treated.
- LithTec™ is safe and easy to install and is applied with a cement or lime spreader truck.

# Environmentally Friendly

- **Zero (0) Hazard Category on SDS Sheet**
- **Passes U.S. EPA Synthetic Precipitation Leaching Procedure Test 1311 & 1312**
- **Demonstrates LithTec™ does not have any harmful chemicals that leach into the environment**

# Sustainable Solutions
# Best Available Technology / Best Available Practices


- **Transportation Industry**

Unprecedented Load Bearing Capacity
Resistance to water infiltration in base
Affordable all weather rural roads

- **Abandoned Uranium Mines (AUMs)**

LithTec™ U-Capping System

- **Superfund Site Remediation**

15 Scientists from 8 National Labs

- **Earth Pond Liners – Algae Biofuel**
- **Earth Block Construction**
- **Responsible Mining Solutions**

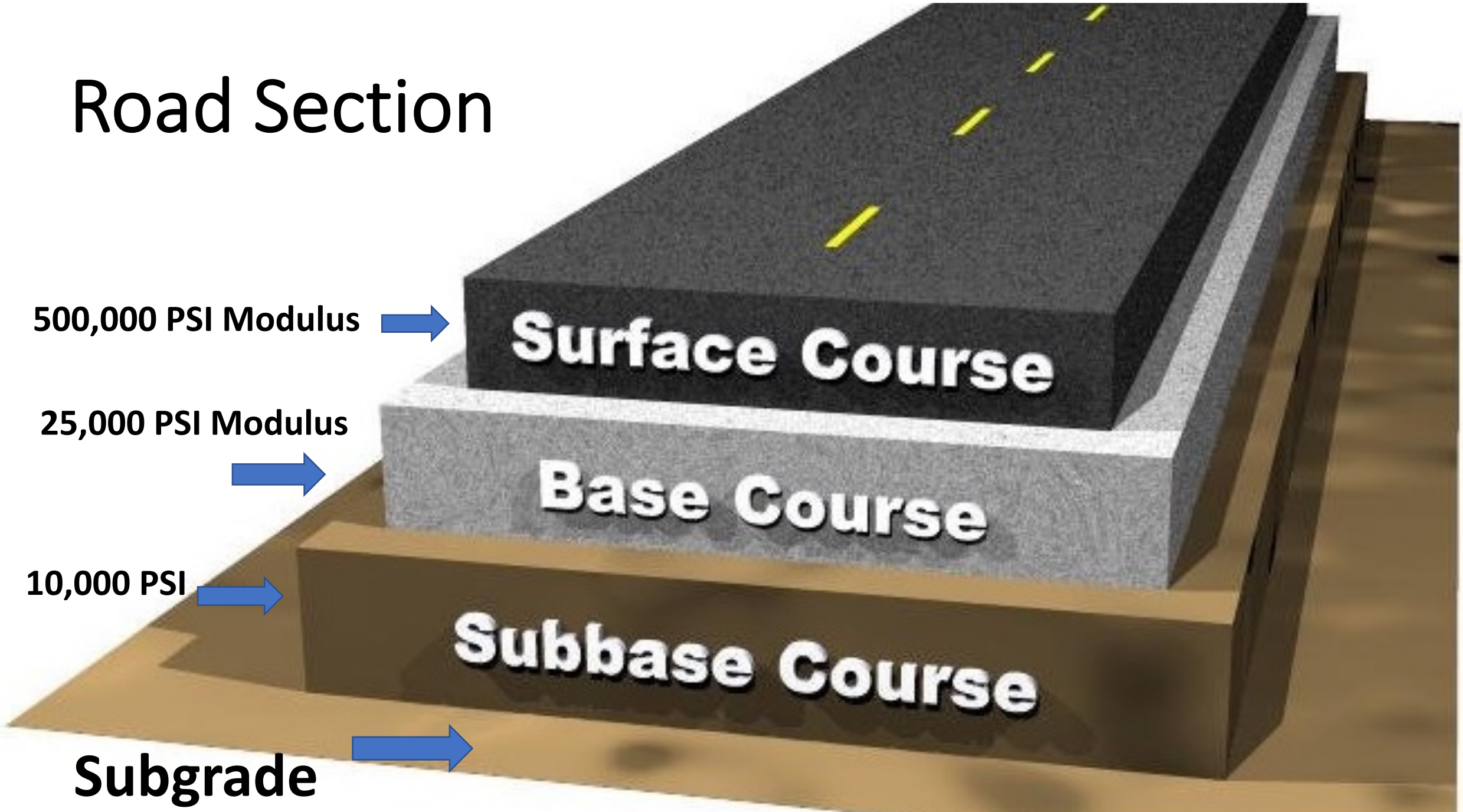
    Mine Tailing Containment (GISTM)
    Safer, cost-effective Haul Roads
    Moving toward Carbon Neutral

# LithTec™ Solution for America's Crumbling Infrastructure

DOT Studies Report…

"Every 40-Ton Truck has as much wear and tear on asphalt highways as 10,000 Automobiles."

# Road Section



# Value Engineering

## Transfer the Structural Credits from Asphalt into LT Base

**Asphalt cost $10 sy, per inch thick**

**LithTec™ cost $2 sy, per inch thick**

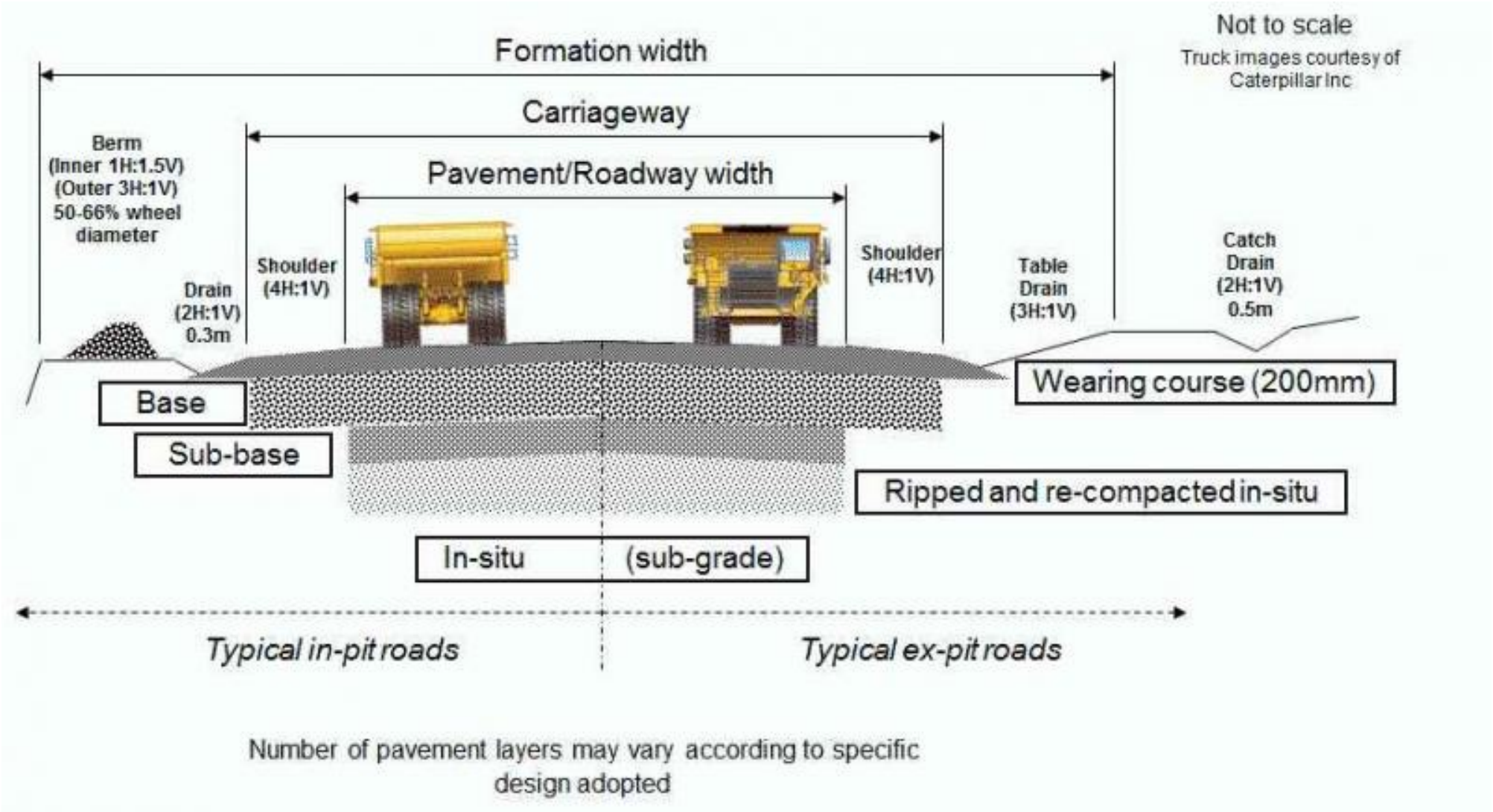
**Strength of Asphalt**
**80% Savings**

1000 x 40-Ton Trucks per day

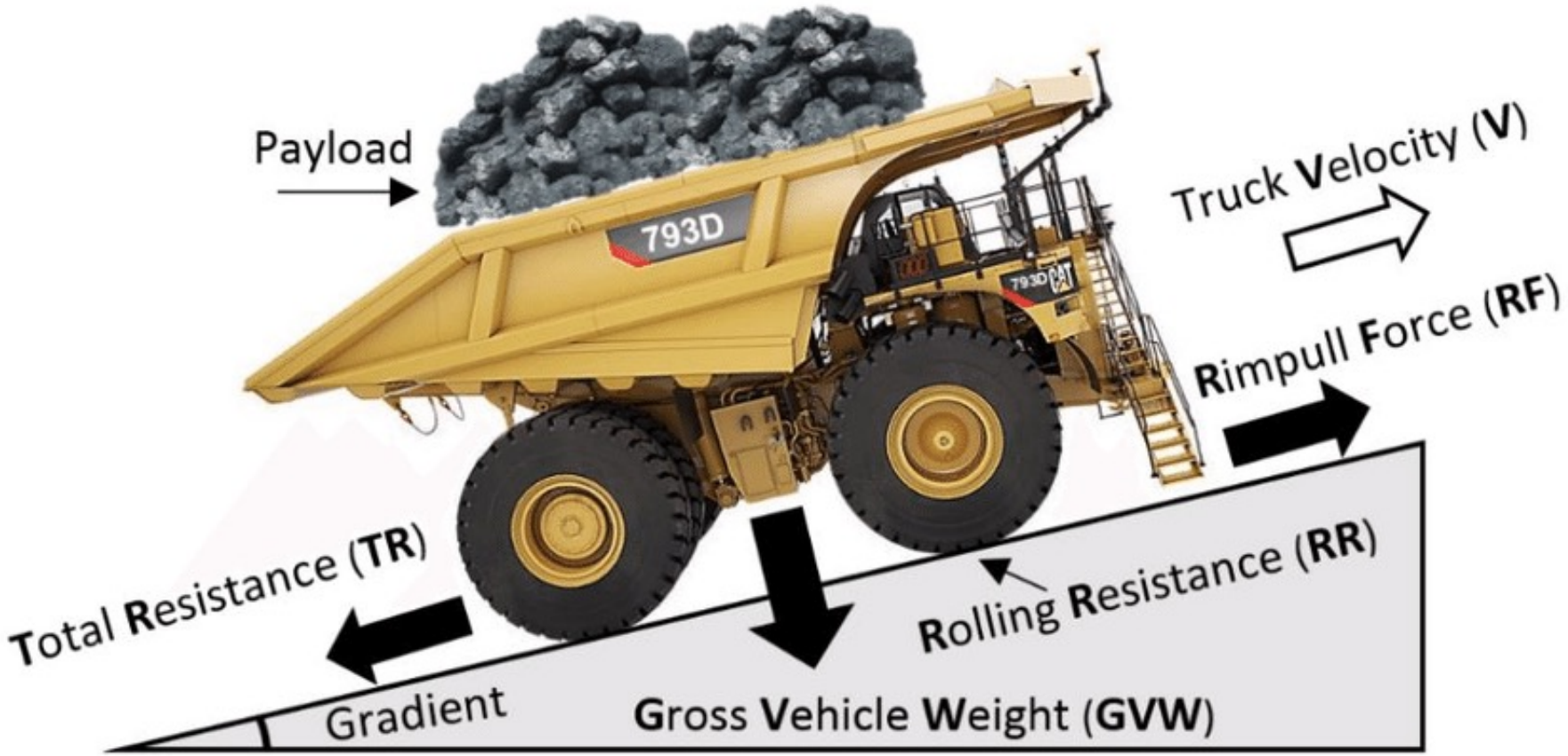
On LithTec™ treated base with Chip Seal surface

- **Over 4 1/2 years old**
- **Headquarters - Ruan Trucking**
- **Chip Seal Surface**
- **8” LithTec™ Treated Base**
- **Full Depth Lithification (FDL)**

# LithTec™ Haul Roads achieve Unprecedented Load Bearing Capacity



# Safer Roads that Require Less Maintenance



# LithTec™ Road = Extreme Load Bearing Capacity & Resistance to Water

**Top two reasons Roads Fail**

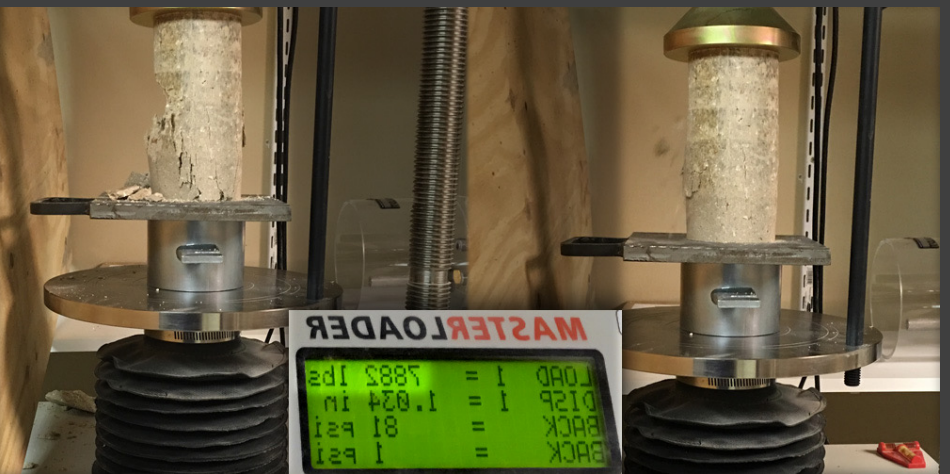
- Insufficient Load Bearing Capacity
- Water infiltration

**LithTec™ Treated Base with Chip Seal Surface**
**After 4 years – Dude Ranch Road**
**Monticello, UT – 8000’ Elevation**

# Lithified Technologies US supplies the Product and all GeoTechnical Testing

# Stage #1
# Materials Sampling

# Stage #2
# Custom Formulations


# Stage #3
# Geotechnical Testing

- California Bearing Ratio - CBR
- Unconfined Compressive Strength - UCS
- Post Submersion Strength Testing
- Modulus Derivative – Resilient Modulus
- Plasticity Index - PI
- Gradation – Soil Classification
- Dispersion – Bound and Non Dispersive
- Shrink/Swell – For Clay Soils

# LithTec™ Remains Bound & Non-Dispersive Under Water

Treated with LithTec™

Same material Untreated

# Los Alamos National Laboratory Testing

**Third Party testing**

Los Alamos NATIONAL LABORATORY

*"The LithTec™ samples suggest that they are potentially ideal materials for the construction of flexible surface and base layer pavements that can be optimized for local conditions." by, Gilles Y. Bussod (PI), Los Alamos National Laboratory LANL, 14 December 2019*

The 38 Page White Paper report summarizing the 1-year LithTec™ study is available upon request.





Slide 21

# Custom Formulation for Rio Tinto Tailings

| Rio Tinto Tailings | | |
|---|---|---|
| TEST TYPE | MINIMUMS | **ACTUAL** |
| Dispersion Test | ND | **ND** |
| Shrink/Swell | <.2 | **0** |
| UCS Stress@Failure | >300 | **705.4** |
| UCS Strain@Failure | >.8 | **.957** |
| Resilient Modulus | >100,000 | **920,235** |

# LithTec™ Treated Tailings
# Passes EPA SPLP 1312 Test

RioTinto

## Rio Tinto Kennecott
### Environmental Laboratory
### *CERTIFICATE OF ANALYSIS*

*Sample Type: EPA Method 1312 SPLP*
Date: 16-Aug-19

2500 S 9180 W
Magna, UT 84044
Phone (801) 569-7952

To: RICK HANSEN

*Submission Date:* 07/22/2019

*Sample Preparation: SW 846 Method 1312*
*Metals Analysis: SW 846 Methods 6010C and 7471*

*QC Reference Sample:*

| *Lab No.* | *Sample Description* | *Collection Date* | *Analysis Date* | *Analyte* | *Result* | *Reporting Limits* | *Units* |
|---|---|---|---|---|---|---|---|
| **CA12082** | UT-019-00102-A | 07/22/2019 | 07/26/2019 | Arsenic | Below PQL | 0.1 | mg/L |
| | | | 07/26/2019 | Barium | 0.2 | 0.1 | mg/L |
| | | | 07/26/2019 | Cadmium | Below PQL | 0.01 | mg/L |
| | | | 07/26/2019 | Chromium | Below PQL | 0.1 | mg/L |
| | | | 07/26/2019 | Lead | Below PQL | 0.05 | mg/L |
| | | | 07/30/2019 | Mercury | Below PQL | 0.0010 | mg/L |
| | | | 07/25/2019 | pH | 8.47 | | |
| | | | 07/26/2019 | Selenium | Below PQL | 0.1 | mg/L |
| | | | 07/26/2019 | Silver | Below PQL | 0.1 | mg/L |

Melissa R. Olsen

Approved by: Melissa R. Olsen
KEL Laboratory Director


**LithTec™ is applied with a Cement Spreader Truck**

The LithTec™ dosage and custom formulation is determined through GeoTechnical lab testing prior to installation


The LithTec™ is blended into the material at OMC with Reclaimer


Rio Tinto LithTec™ Installation, Magna, UT 2020

Haul road constructed on top of 10,000 acres of tailings


3rd Party Densometer testing

# Stage #4
# Quality Control
# Onsite Performance Testing

- Moisture Content Testing
- Nuclear Densometer
- Lightweight Deflectometer Testing
- Treated depth control

# Sheeps Foot Compaction


# Grading & Blading

# Final Compaction with Steel Roller

# Chip Seal Over LithTec™ Base

Rio Tinto - Kennecott
Needs Water Resistant Road for
5-Mile Underground Tunnel (2023)

# LithTec™ Risk Management Solution for Tailings Containment

## (GISTM) Global Industry Standard on Tailings Management

ELEMENTUS RARE EARTHS & MINERALS
a DADA holding

Red Mud - BAUXITE RESIDUE

Kaiser Aluminum

- 30 Million Tons of Bauxite Residue – Goal- zero waste
- MOU for all Aluminum Mining in US and Louisiana
- 399,000 psi Modulus
- Passed EPA SPLP 1312 – No leaching of toxic chemicals


Chip Seal haul road on top
of LithTec™ treated base
Blue Diamond Almonds

# Lithified Technologies

# In The News…


Honorable Speaker Ben Luján AWARD for Small Business Excellence

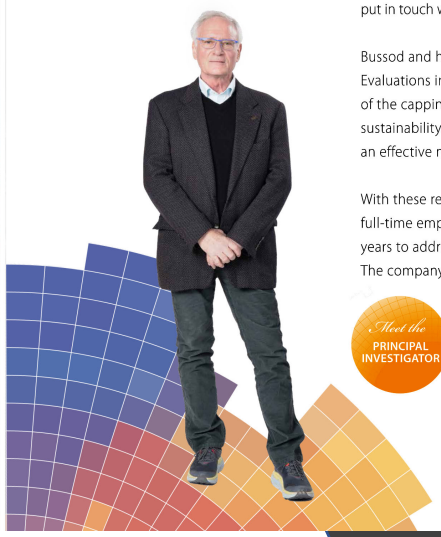
**BOB SHERWIN**
*CEO*



BERNALILLO, SANTA FE, AND SAN JUAN COUNTIES

*There are only two labs that can measure uranium containment, and Los Alamos is number one by far. Thanks to our collaborative work with Los Alamos through NMSBA, we now have a white paper as analytical proof that the LithTec™ U-capping system is an effective uranium containment solution.*

**BOB SHERWIN**
*CEO*
*Lithified Technologies US, LLC*



# REBUILDING INFRASTRUCTURE LEVERAGED PROJECT

Lithified Technologies US developed a soil technology known as LithTec™ that mimics lithification, a natural process that transforms soil into stone. This process provides optimal strength for road infrastructure enabling thoroughfares and highways to last much longer. A common saying in road construction is: "Roads may wear from the top, but they fail from the bottom." LithTec is specifically designed to counter such road failures.

Bob Sherwin became aware of a very serious problem involving 523 abandoned uranium mines (AUMs) on the Navajo Nation. None of over 200 water wells could be used due to the high uranium content, so water has to be trucked in from over 100 miles away, and the people living near these sites have high rates of cancer and birth defects. Sherwin wanted to know if LithTec could provide a better solution for capping the AUMs.

In conjunction with Haven's Transport, LLC; Blanca Peak Indigenous Investments; and Blanca Holdings, LLC; Lithified Technologies approached NMSBA and was put in touch with Gilles Bussod at Los Alamos National Laboratory.

Bussod and his team evaluated LithTec's suitability for capping AUMs. Evaluations included assessing the strength and hydrochemical characteristics of the capping system, uranium sorption capacity, and overall suitability and sustainability. The evaluations concluded that the LithTec U-Capping system is an effective method for capping the AUMs and mitigating local contamination.

With these results in hand, Lithified Technologies US hired four additional full-time employees and plans to hire additional staff within the next five years to address the capping of AUMs and other LithTec applications. The company anticipates $10–$20 million in new revenues in 2021.

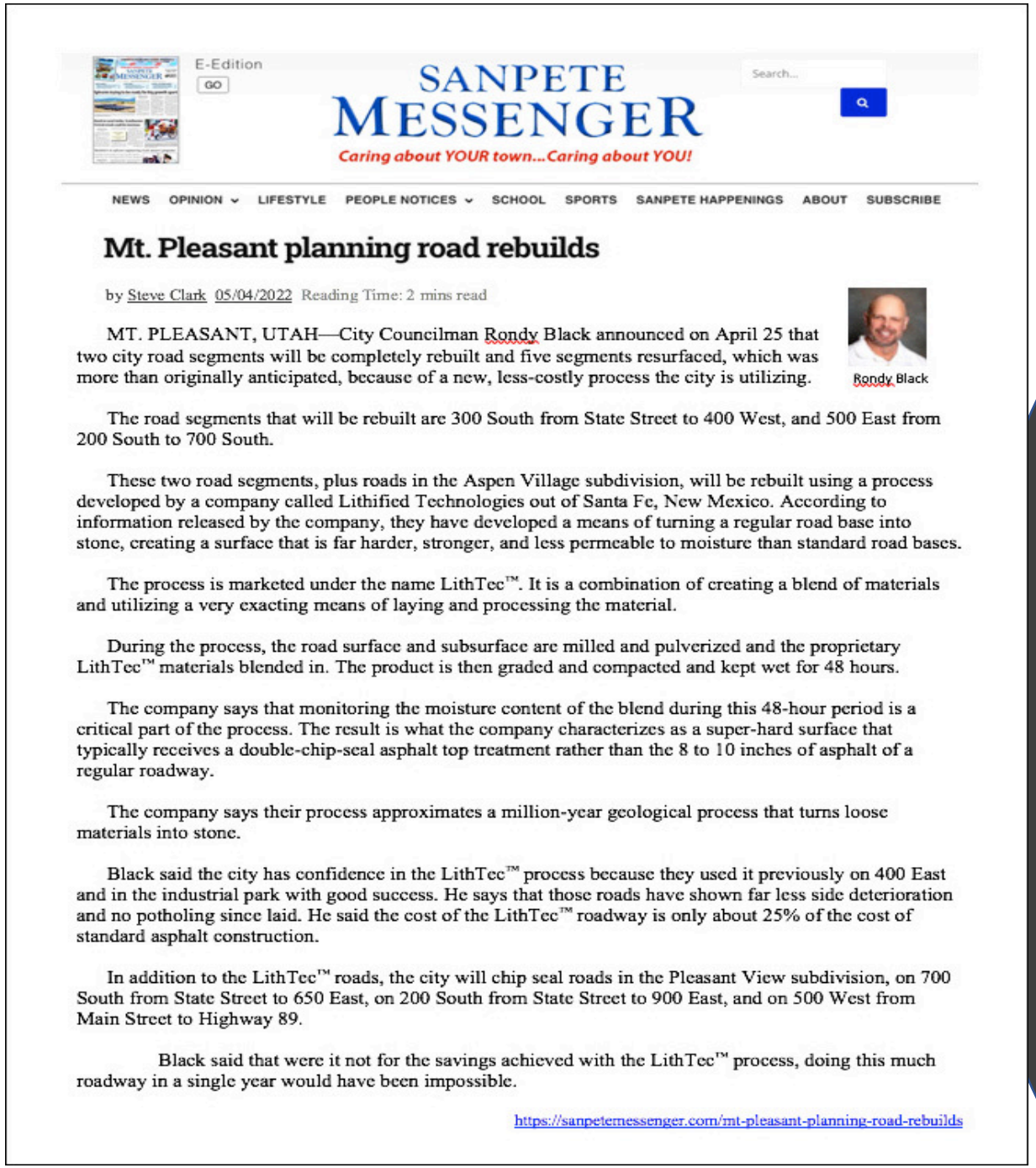
Meet the PRINCIPAL INVESTIGATOR

**GILLES YVES A. BUSSOD**
*Los Alamos National Laboratory*





**Lithified Technolo featured in LANL Annual Repo**



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## Mt. Pleasant planning road rebuilds

by Steve Clark 05/04/2022 Reading Time: 2 mins read



Rondy Black

MT. PLEASANT, UTAH—City Councilman Rondy Black announced on April 25 that two city road segments will be completely rebuilt and five segments resurfaced, which was more than originally anticipated, because of a new, less-costly process the city is utilizing.

The road segments that will be rebuilt are 300 South from State Street to 400 West, and 500 East from 200 South to 700 South.

These two road segments, plus roads in the Aspen Village subdivision, will be rebuilt using a process developed by a company called Lithified Technologies out of Santa Fe, New Mexico. According to information released by the company, they have developed a means of turning a regular road base into stone, creating a surface that is far harder, stronger, and less permeable to moisture than standard road bases.

The process is marketed under the name LithTec™. It is a combination of creating a blend of materials and utilizing a very exacting means of laying and processing the material.

During the process, the road surface and subsurface are milled and pulverized and the proprietary LithTec™ materials blended in. The product is then graded and compacted and kept wet for 48 hours.

The company says that monitoring the moisture content of the blend during this 48-hour period is a critical part of the process. The result is what the company characterizes as a super-hard surface that typically receives a double-chip-seal asphalt top treatment rather than the 8 to 10 inches of asphalt of a regular roadway.

The company says their process approximates a million-year geological process that turns loose materials into stone.

Black said the city has confidence in the LithTec™ process because they used it previously on 400 East and in the industrial park with good success. He says that those roads have shown far less side deterioration and no potholing since laid. He said the cost of the LithTec™ roadway is only about 25% of the cost of standard asphalt construction.

In addition to the LithTec™ roads, the city will chip seal roads in the Pleasant View subdivision, on 700 South from State Street to 650 East, on 200 South from State Street to 900 East, and on 500 West from Main Street to Highway 89.

Black said that were it not for the savings achieved with the LithTec™ process, doing this much roadway in a single year would have been impossible.

https://sanpetemessenger.com/mt-pleasant-planning-road-rebuilds

# Lithified Technologies in the Utah News

"...two city road segments will be completely rebuilt and five segments resurfaced...

...because of a new, less-costly process the city is utilizing...

...under the name LithTec™"

**5-4-2022**


Pagosa Springs completes 3 LithTec™ Roads
LOCAL NEWS NETWORK
Durango


San Juan
News
Video Link
KSL
6:03
89°
#KSLLive


TED DANSON
HOST

# Sustainable Earth Solutions

**LithTec.com** to Learn More
or Call 1-(877) 437-9468
Email Bob@LithTec.com


THANK YOU