**Overview of Research Information**

This document is an outline of how each folder is broke down, what information is within each folder, and how to read some of the data tables.

**Entire Data Published Breakdown**

* **Overall Dry-down Project Run (Folder/Files)**
* **Run#/Replication Folder** - Within each Run folder there is a 5TM data folder, several folders by date of when readings were taken, and an Excel file that is the complete data sets for each run.
* **General Pictures**
  + This folder shows pictures of how the trial was laid out, the light box used, how soil sensors were organized with data logger, the fan used, etc.
* **5TM calibration data** 
  + This file is the calibration correction equations used to convert raw data from each 5TM soil sensor collected and stored in the CR300 data logger.
* **5TMX6\_CR300\_Dec\_07\_04**
  + This file is the shortcut program file used with the CR300 data logger to continuously collect volumetric water content using Meter Group 5TM sensors
* **Distribution of Cloud Data Table**
  + This is a table of data that the distribution of upper data points were analyzed to determine a conservative upper asymptote value where a plant response was observed from moisture stress. The was determined by data from each treatment from each dry-down cycle. The data was first determined to be normal and then the mean determined within this upper data region. Then one standard deviation was subtracted from the mean to provide a conservative upper asymptote value for each treatment within each dry-down cycle and to ensure all were treated the same.
* **Indices and Derivative Calculation**
  + This file is the calculations for the numerous indices, including the ones used for our research and was the basis for organizing all the data
* **JMP Rep 1-6 Data Table**
  + This file, ‘JMP Reps 1-6 Data Table’ file is the JMP data table used for all analyses derived from within the excel file, ‘Reps 1-6 overall data’ and sheet reps 1-6 data compiled
* **Randomization sheets** 
  + This file shows the randomization used for each replication based on the location of the fan. The color circles around each set of numbers represent the color coding assigned to each sensor for each treatment.
* **Rating Data Templates** 
  + This file is the rating sheets by replication used to keep track of parameter data collected over time such as temperature, date, time, turf quality, and wilt percent.
* **Reps 1**-**6 overall data**
  + Within this excel sheet, Reps 1-6 data compiled is a sheet that has the compiled data based on the following parameters, WBI, NDVI, GRVI, VWC, Wilt% and Turf Quality of all replications. A more complex breakdown of how the data table reads is explained in the replication folder. Reps 1-6 parameter table is a sheet based on exported critical values of a non-linear four parameter fit model by replication by vegetation index investigated (WBI, GRVI ,and NDVI). Lastly the wilt prediction table is based on adjusted lower and upper asymptotes from the parameter table sheet and other critical values transformed to their corresponding hour occurrence. These values then used to determine wilt prediction.
* **Parameter table** 
  + ‘Reps 1-6 Parameter table’ is the same corresponding table as ‘Rep 1-6 parameter table’ which is a sheet located within the excel file Reps 1-6 overall data and used for further analysis of regression fit lines.
* **Wilt Prediction Table reps 1-6 (based on Distribution Could Data Table Results)**
  + This file is a JMP table linked to the Wilt prediction sheet within the excel file reps 1-6 overall data. This table was used for calculating the differences of 4 parameter critical points and subtracting the hour differences for wilt prediction
* **Replication/Run breakdown -** This section will involve a more detailed breakdown of how to read the excel files by replication (with the same principles being applied to the compiled data table). It will also cover what other information is within each replication folder.
* **5TM data -** This folder contains an excel file that is extracted from the CR300 data logger that continually collects volumetric water content throughout each run. At the top of this file starting with cell A2 from left to right as follows:
  + Column A, Row 2: Time stamp of data collection
  + Column C, Row 2: Record number
  + Columns D – I, Row 2: Raw data for sensors 1 - 6
  + Columns J – O, Row 2: volumetric water for sensors 1-6
  + Columns P – U, Row 2: Temperature values for sensors 1-6
* At the bottom of each 5TM file starting with cell A592 is as follows from left to right
  + Column A, Row 592: Date of data collected
  + Column B, Row 592: Time of data collected
  + Column C: Record number or data collected
  + Columns D – I, Row 592: Each treatment in order from left to right (Bent sand, bent sand loam, bent clay, Bermuda sand, Bermuda sand loam, Bermuda clay) with their correction factor applied to the raw data values. These are generated from the manual calibration equations generated from comparing raw data values to hand calculated gravimetric water values by soil type from the 5TM calibration data file.
* **Folders by date**
  + Within each folder by date there are corresponding times to when light reflectance readings were collected for that date and ranging between 7am to 7pm, respectively
    - Within these folders for each specific time there is an excel sheet containing light box images of each treatment, original .SED files that contain raw data of light reflectance measurements for each treatment. There is also an excel file to which the .SED files gathered by the radiometer are converted to and then merged to one overall excel sheet that has compiled data along with the date by time of readings taken.
  + **Breakdown of compiled data by replication: (organized the same for all replications) (\*note replication 1 has some derivative calculation data, however, this was experimental and is not the case for other replication files\*)** 
    - Within the overall excel file compiled by rep there is a Data Compiled Sheet for JMP analysis and the date with the corresponding hour the readings were taken. Each data and time of data collection has its own separate sheet with spectral data values and organized in temporal order
      * **Date and time sheets** 
        + Within each sheet there are several key components:
      * Column A, Row 7: The nanometer wavelength where reflectance values are gathered,
      * Column B, Row 7: Reflectance of white reference calibration pad
      * Column C – H, Row 7: The reflectance percentage at each bandwidth in order from left to right of each treatment (bent sand, bent sand loam, bent clay, bermuda sand, bermuda sand loam, bermuda clay).
      * Column A, Row 520 – 537: 16 different vegetation indices calculated from spectral data collected but for our study only three were used (NDVI, GRVI, WBI)
      * Column B – H, Rows 520 – 537: This section is vegetation index values derived from spectral data located in cells above with column B being the white reference calibration and columns C – H from left to right subsequent treatments (Bent sand, bent sand loam, bent clay, bermuda sand, bermuda sand loam, bermuda clay)
      * Column B – H, Rows 539 – 556: This is the same values as the above section just copied without formulas to allow transposing the data for later analysis
      * Columns A – S, Rows 558 – 564: This section is the transposed values from the above section and organized by index in the column and grass species by soil type treatments in the rows
      * **Data Compiled for JMP Sheet**
        + **Bottom of Data Compiled Sheet -** To start with their several key sections within each data compiled sheet by replication. At the bottom of the sheet starting from left to right there is some information that explain key details to understand the overall table (note the rows are not included because the number differs depending on each dry-down replication):

**Column A: Corresponding Number to Date/Time-** this is a chronological number coding to date and time readings were taken to correlate with the data book where parameter information (VWC, wilt, TQ, and temperature) were taken

**Column B: Date/Time –** date and time light readings and all other data were collected for each data collection event

**Column C: Hours After Initiation –** this is the hours after the initiation of each rep

**Column E and F: Grass Species –** the grass species were bent and bermudagrass with the corresponding factor code

**Column G and H: Soil Type –**  the soil types were 90:10 sand, sand loam, and clay with their corresponding factor codes

**Column I and J –** these are the crosses of the two factors grass by species and their corresponding treatment codes.

* + - * + **Top of The Data Compiled Sheet** (note the total column amount will not be noted because this will change depending on the replication)

**Parameter by date and time -**  Starting with Cell N1 the parameters are in order as follows in descending order:

* + - * + WBI
        + NDVI
        + GRVI
        + VWC
        + Wilt Percent
        + Turf Quality

Each parameter has the data or rating value corresponding to the treatment and ordered vertically by date and time when each parameter was collected. Each value is extracted from the same date and time sheet that is merged to each overall replication excel workbook. These values for each parameter are then organized into one large column ranging from A to L. **One important thing to note is the highlighted data at the end of each replication is when the 5TM sensors were removed and total necrosis was observed for all treatments, but still light reflectance values were collected. This was done to capture any potential differences even after complete death occurred.** After the conclusion of each replication, Columns A – L for each replication were copied and merged to the Reps 1-6 overall data table.