

# Tom Bliss Tutorial

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10/20/2020

This is adapted from Tom Bliss's tutorial on Kaggle.

First, we load in the required libraries.

```
library(tidyverse)

## -- Attaching packages ----- tidyverse 1.3.0 --
## v ggplot2 3.3.2      v purrr  0.3.4
## v tibble  3.0.3      v dplyr  1.0.2
## v tidyr   1.1.2      v stringr 1.4.0
## v readr   1.3.1      v forcats 0.5.0

## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()

library(gganimate)
library(cowplot)
library(repr)
```

Then, we read in the data.

```
##reading in non-tracking data

#includes schedule info for games
df_games <- read_csv(here::here("datasets/games.csv"),
                     col_types = cols())

#includes play-by-play info on specific plays
df_plays <- read_csv(here::here("datasets/plays.csv"),
                     col_types = cols())

#includes background info for players
df_players <- read_csv(here::here("datasets/players.csv"),
                       col_types = cols())

##Reading tracking data (needs to be done iteratively)

df_tracking <- read_csv(here::here("datasets/week1.csv"),
                       col_types = cols())
```

Next, we standardize field coordinates to ensure that the offense is always going in the same direction.

```

### Standardize tracking data so it's always in direction of offense
### vs raw on-field coordinates
df_tracking <- df_tracking %>%
  mutate(x = ifelse(playDirection == "left", 120-x, x),
         y = ifelse(playDirection == "left", 160/3 - y, y))

```

Then, we are going to animate a couple plays. First, we declare our field boundaries that will be used in our plots.

```

### Declare values for general field boundaries
xmin <- 0
xmax <- 160/3
hash.right <- 38.35
hash.left <- 12
hash.width <- 3.3

```

Next, we select a play and merge it with our games data and tracking data

```

#picking a random play
set.seed(1)

### Select games from week 1, since I only loaded in week 1 tracking data
df_games_week1 <- df_games %>%
  filter(week == 1)

### Only select plays that occurred in week 1
df_plays_week1 <- semi_join(df_plays, df_games_week1, by = "gameId")

### Select a random play from week 1
example_play <- df_plays_week1 %>%
  select(gameId, playId, playDescription) %>%
  sample_n(1)

### merging games data to play
example_play <- inner_join(example_play,
                          df_games,
                          by = c("gameId" = "gameId"))

### merging tracking data to play
example_play <- inner_join(example_play,
                          df_tracking,
                          by = c("gameId" = "gameId",
                                "playId" = "playId"))

```

Now I have the play, game, and tracking data from this play in week 1 of 2018.

Now, we can create our plot of the play.

```

### colors for plot. Order: offense, football, defense
cols_fill <- c("#FFB612", "#663300", "#97233F")
cols_col <- c("#000000", "#663300", "#000000")

### play description will be title of plot
### gsub() replaces a regex with something, so this seems to

```

```

### be replacing anything with parenthesis with nothing
plot_title <- str_trim(gsub("\\s*\\([^\)]+\)", "", as.character(example_play$playDescription[1])))

### Specific boundaries for a given play
ymin <- max(round(min(example_play$x, na.rm = TRUE) - 10, -1), 0)
ymax <- min(round(max(example_play$x, na.rm = TRUE) + 10, -1), 120)

### Hash Marks
df.hash <- expand.grid(x = c(0, 23.36667, 29.96667, xmax), y = (10:110))
df.hash <- df.hash %>% filter(!(floor(y %>% 5) == 0))
df.hash <- df.hash %>% filter(y < ymax, y > ymin)

### Time to actually plot!
ggplot() +

#setting size and color parameters
scale_size_manual(values = c(6, 4, 6), guide = FALSE) +
scale_shape_manual(values = c(21, 16, 21), guide = FALSE) +
scale_fill_manual(values = cols_fill, guide = FALSE) +
scale_colour_manual(values = cols_col, guide = FALSE) +

#adding hash marks
annotate("text", x = df.hash$x[df.hash$x < 55/2],
          y = df.hash$y[df.hash$x < 55/2], label = "_", hjust = 0, vjust = -0.2) +
annotate("text", x = df.hash$x[df.hash$x > 55/2],
          y = df.hash$y[df.hash$x > 55/2], label = "_", hjust = 1, vjust = -0.2) +

#adding yard lines
annotate("segment", x = xmin,
          y = seq(max(10, ymin), min(ymax, 110), by = 5),
          xend = xmax,
          yend = seq(max(10, ymin), min(ymax, 110), by = 5)) +

#adding field yardline text
annotate("text", x = rep(hash.left, 11), y = seq(10, 110, by = 10),
          label = c("G", seq(10, 50, by = 10), rev(seq(10, 40, by = 10))), "G"),
          angle = 270, size = 4) +
annotate("text", x = rep((xmax - hash.left), 11), y = seq(10, 110, by = 10),
          label = c("G", seq(10, 50, by = 10), rev(seq(10, 40, by = 10))), "G"),
          angle = 90, size = 4) +

#adding field exterior
annotate("segment", x = c(xmin, xmin, xmax, xmax),
          y = c(ymin, ymax, ymax, ymin),
          xend = c(xmin, xmax, xmax, xmin),
          yend = c(ymax, ymax, ymin, ymin), colour = "black") +

#adding players
geom_point(data = example_play, aes(x = (xmax-y),
                                     y = x,
                                     shape = team,
                                     fill = team,

```

```

                                group = nflId,
                                size = team,
                                colour = team),

    alpha = 0.7) +

#adding jersey numbers
geom_text(data = example_play, aes(x = (xmax-y), y = x, label = jerseyNumber), colour = "white",
          vjust = 0.36, size = 3.5) +

#applying plot limits
ylim(ymin, ymax) +
coord_fixed() +

    #applying theme
theme_nothing() +
theme(plot.title = element_text()) +

#titling plot with play description
labs(title = plot_title) +

#setting animation parameters
transition_time(frameId) +
ease_aes('linear') +
NULL

```

```

## Warning: Removed 5 rows containing missing values (geom_text).

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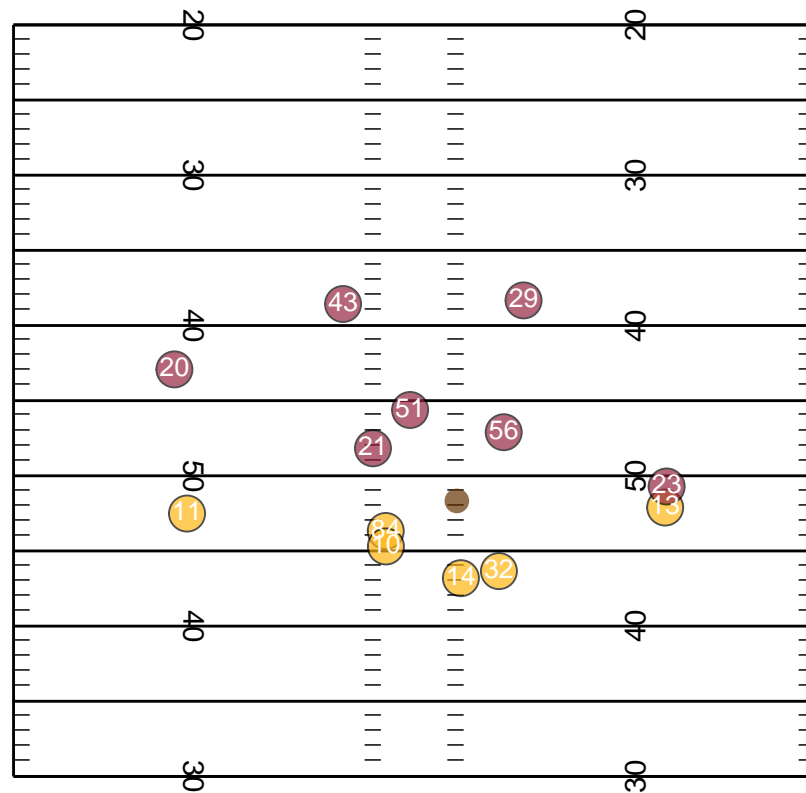
## Warning: Removed 5 rows containing missing values (geom_text).

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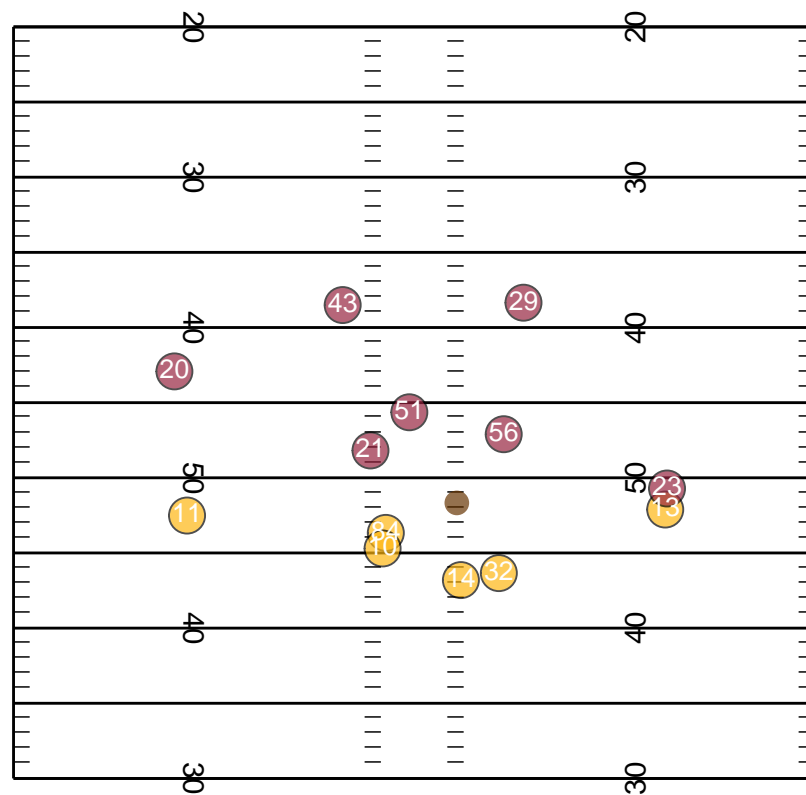
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



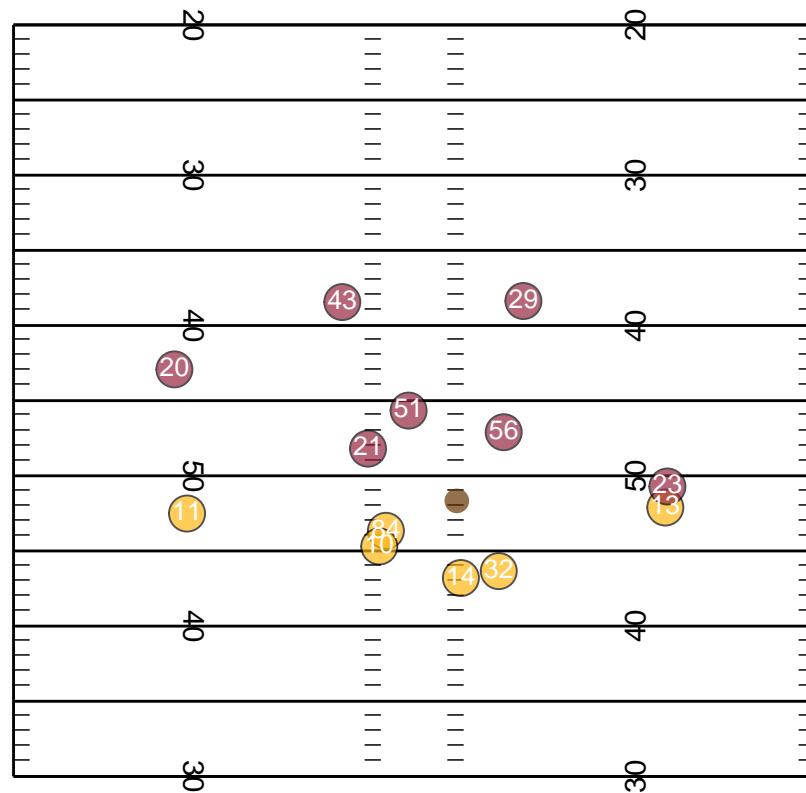
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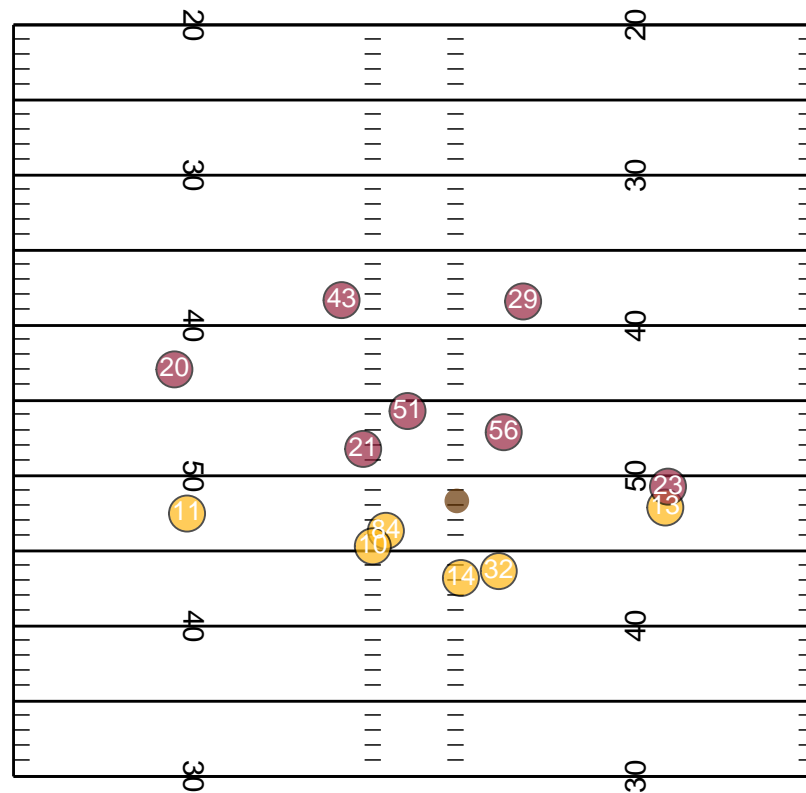
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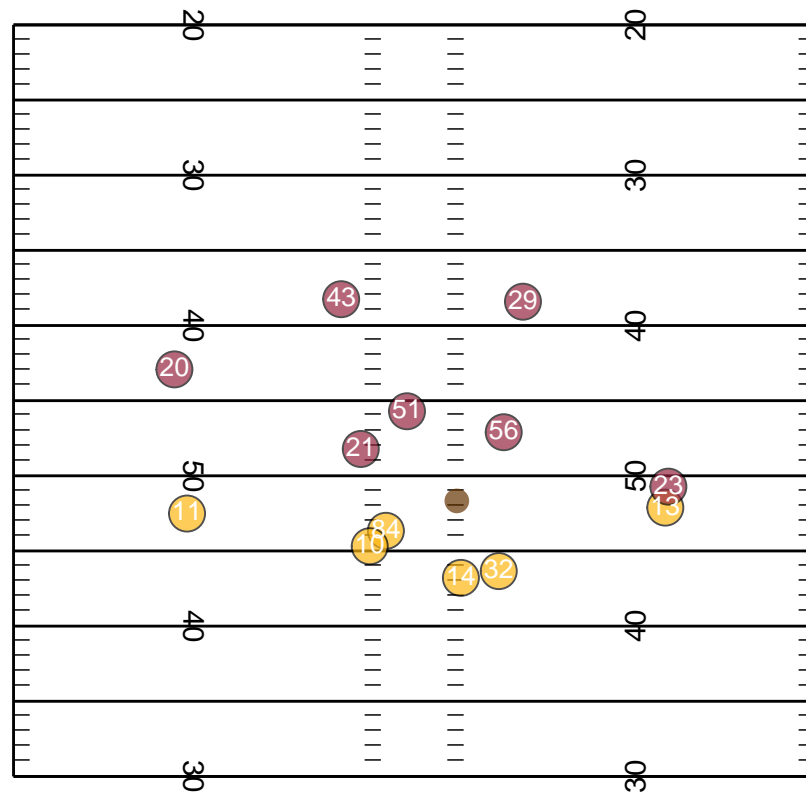
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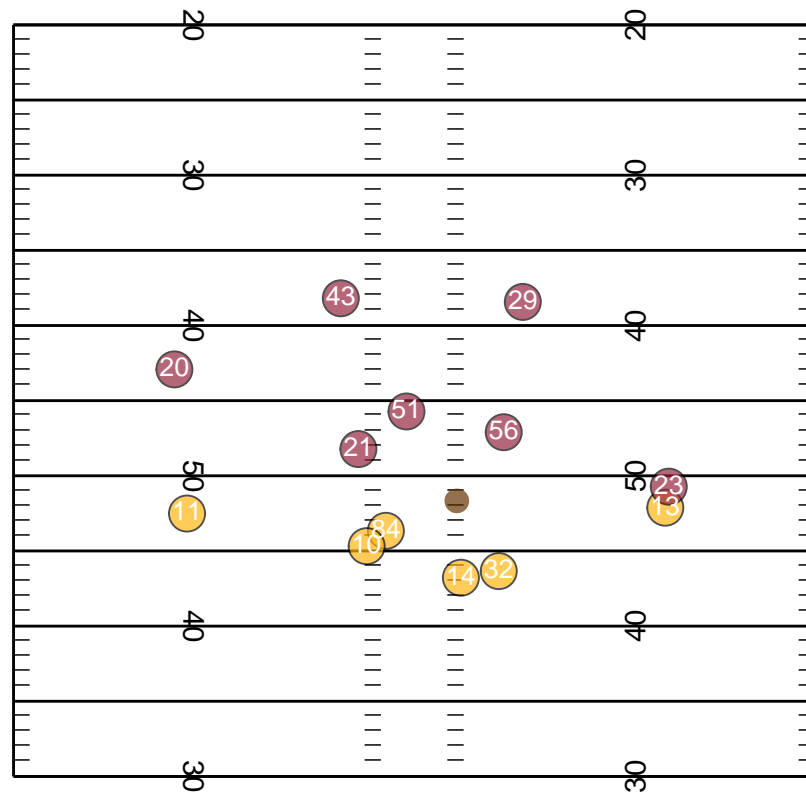


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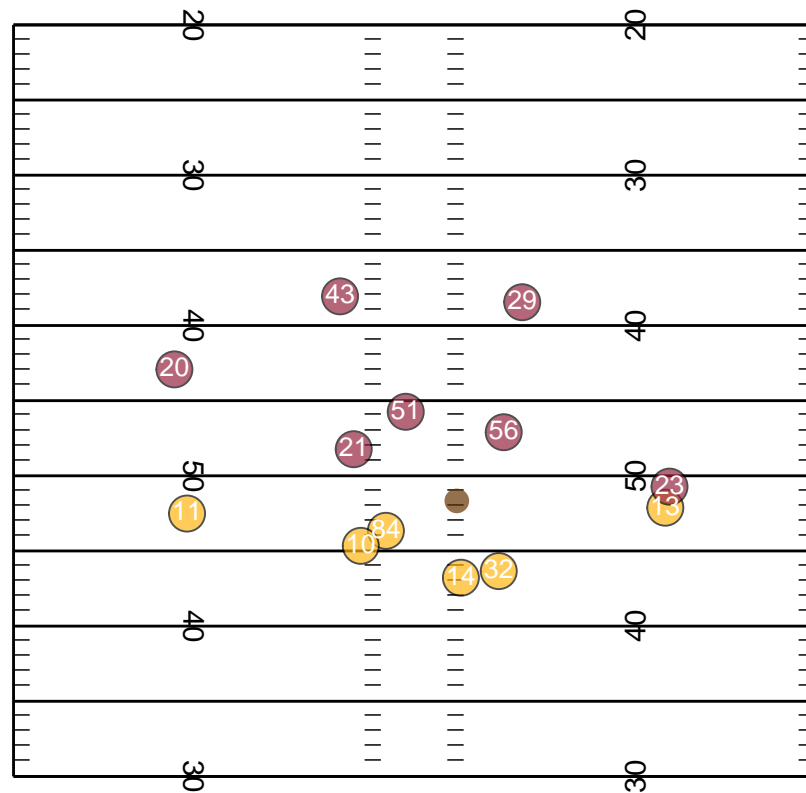
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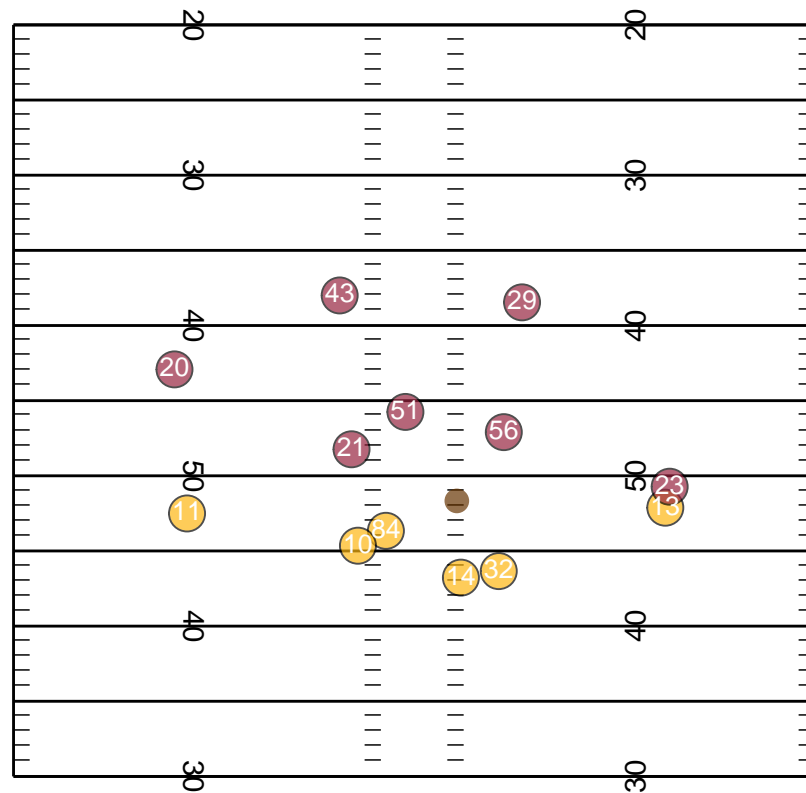
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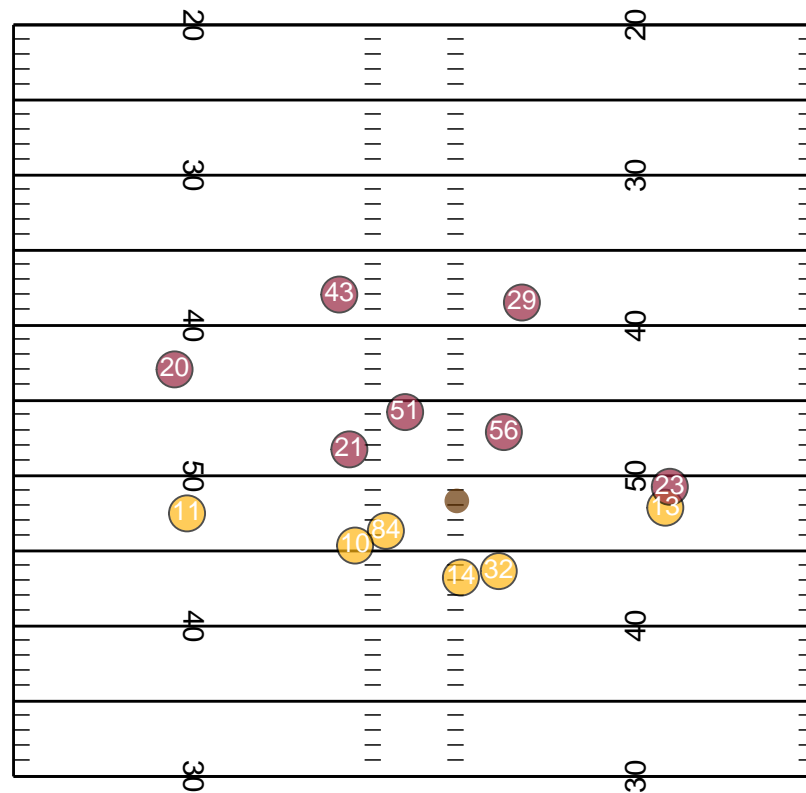
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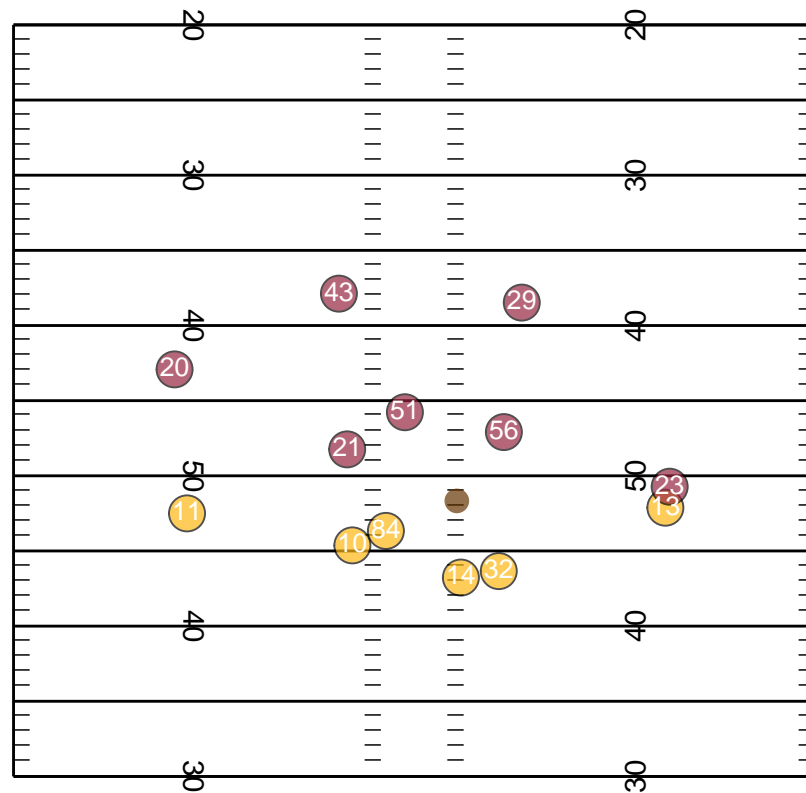
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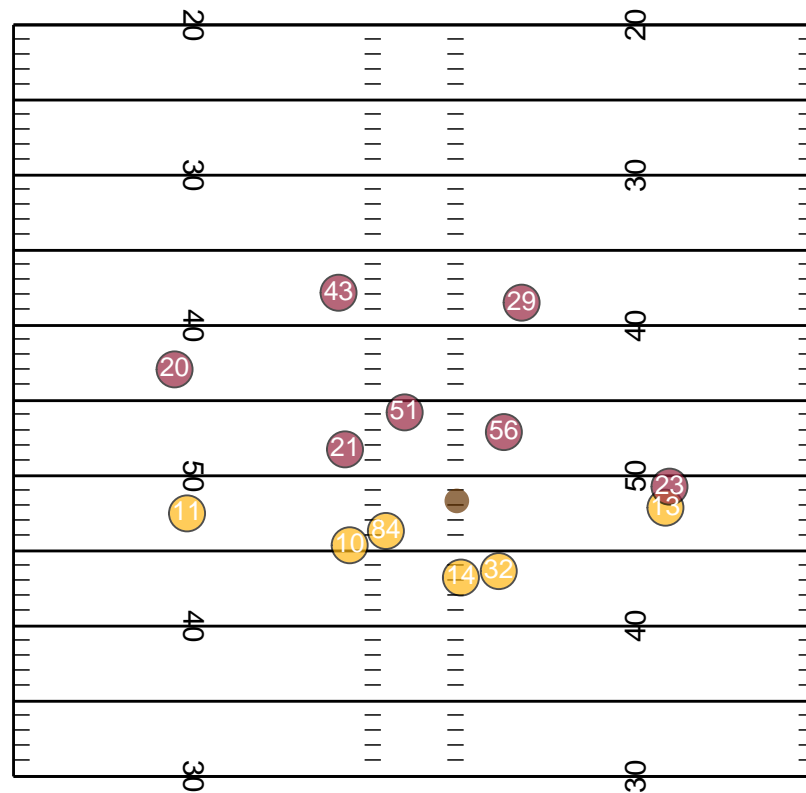
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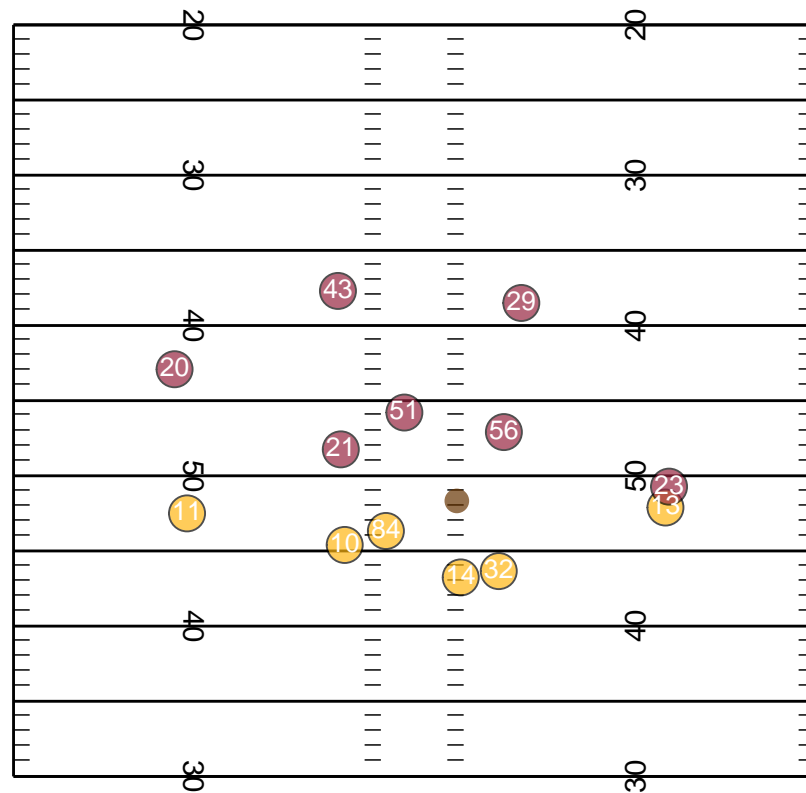
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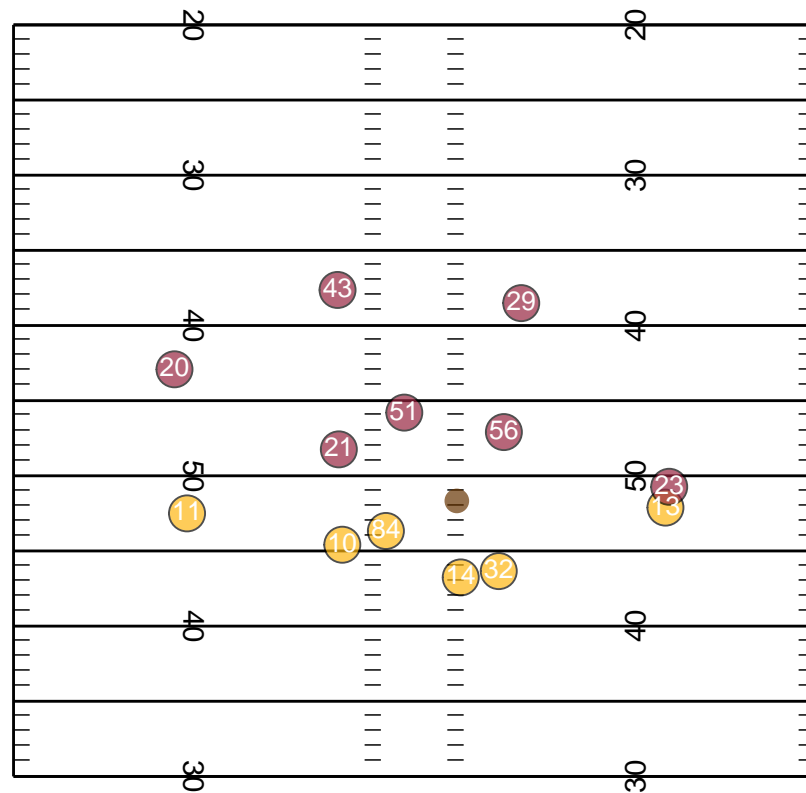
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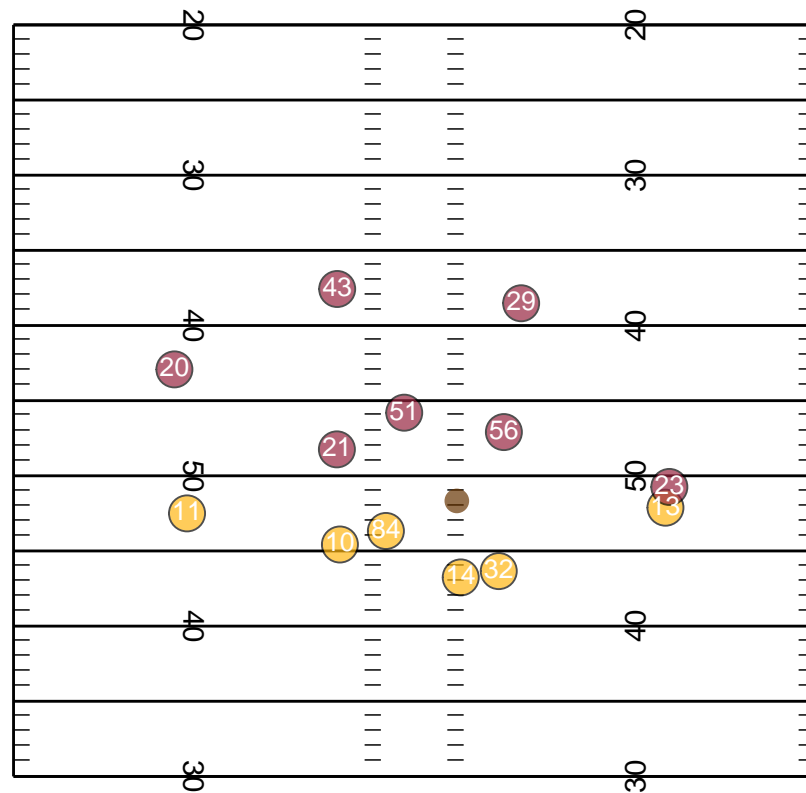


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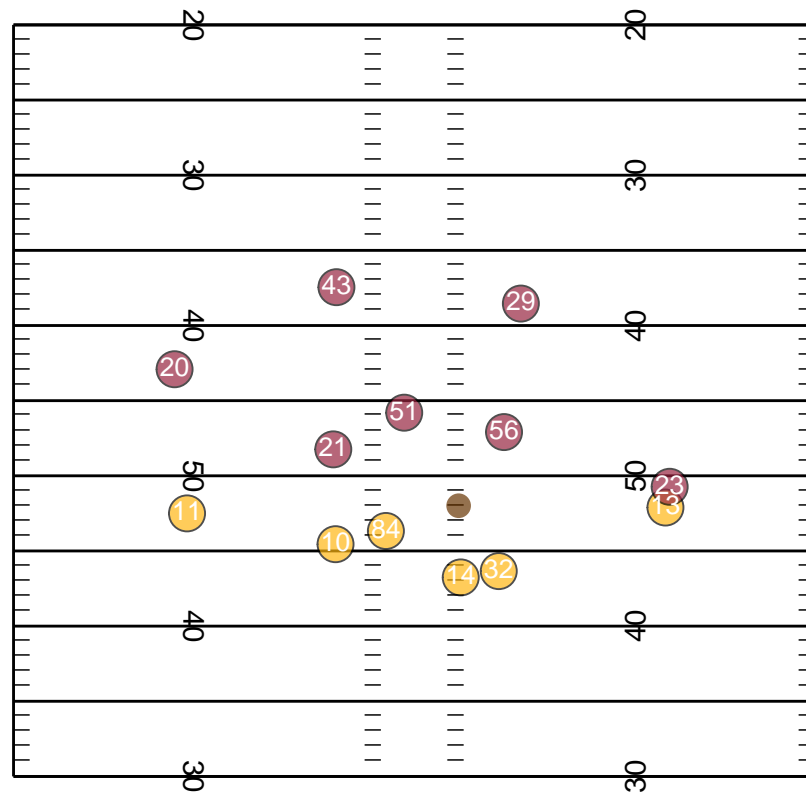
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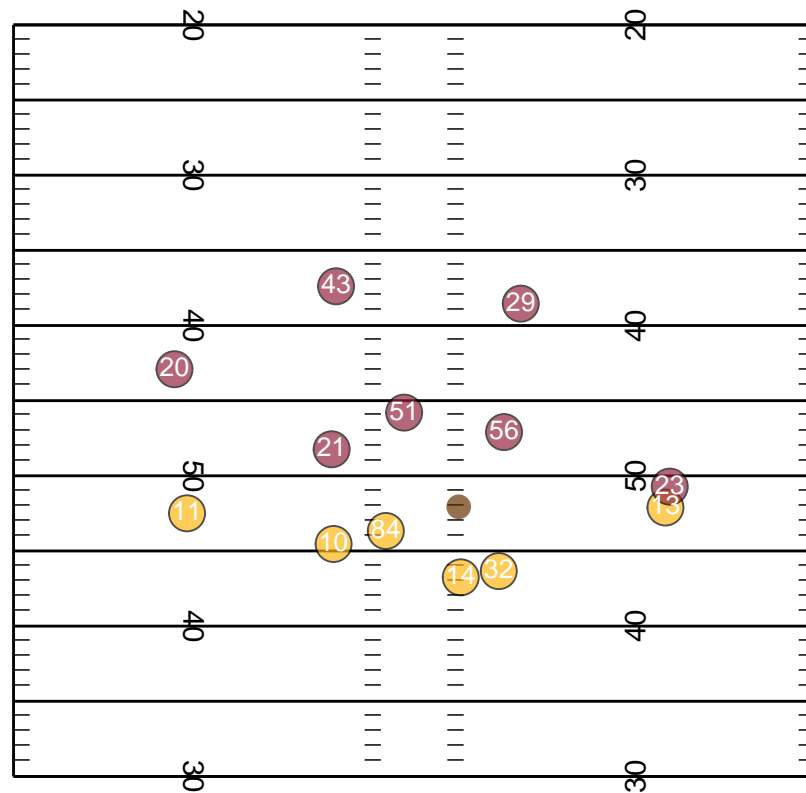
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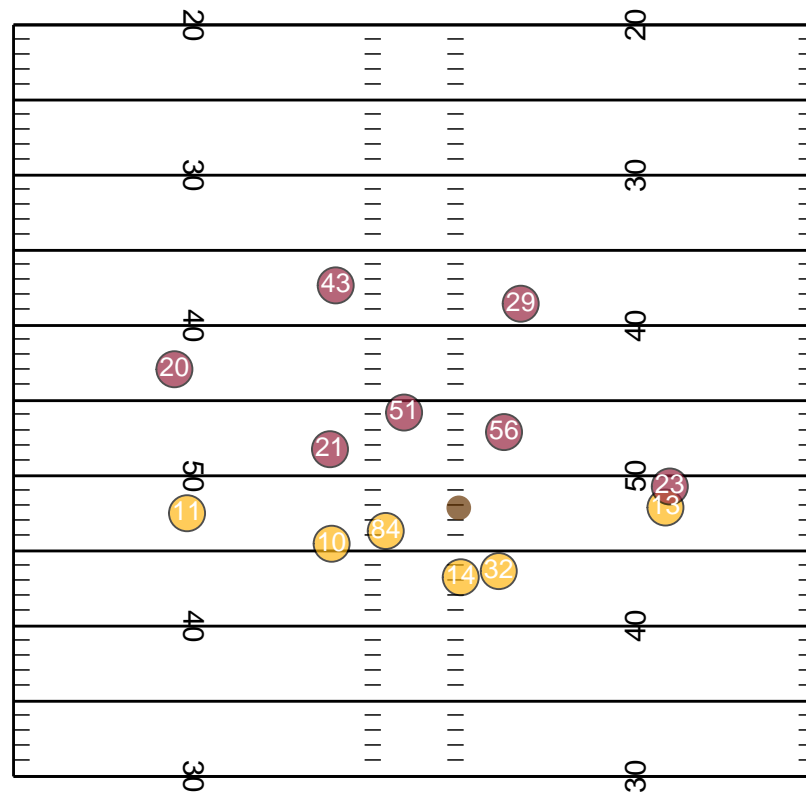
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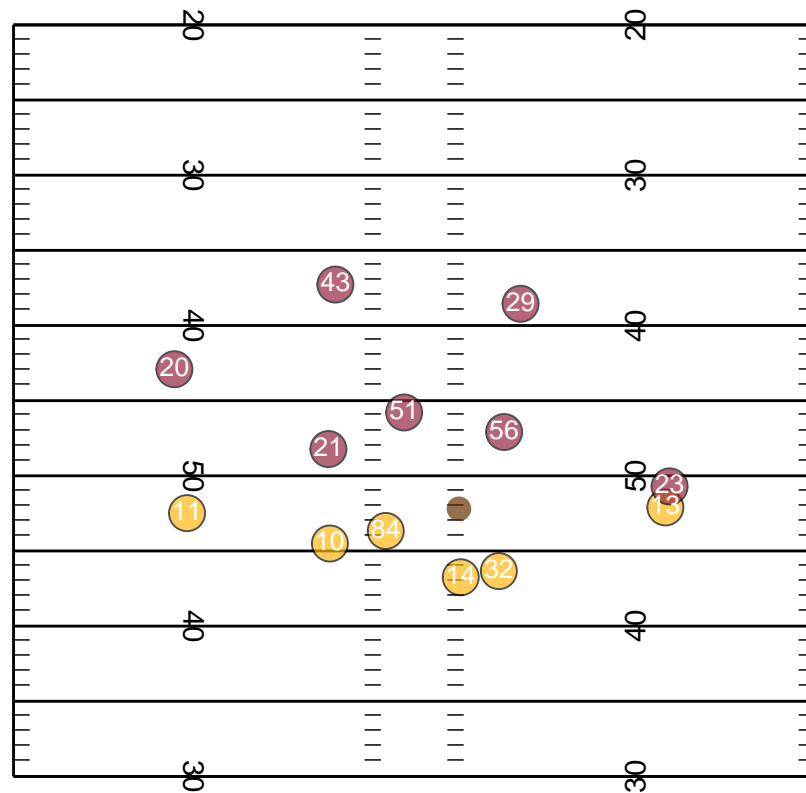
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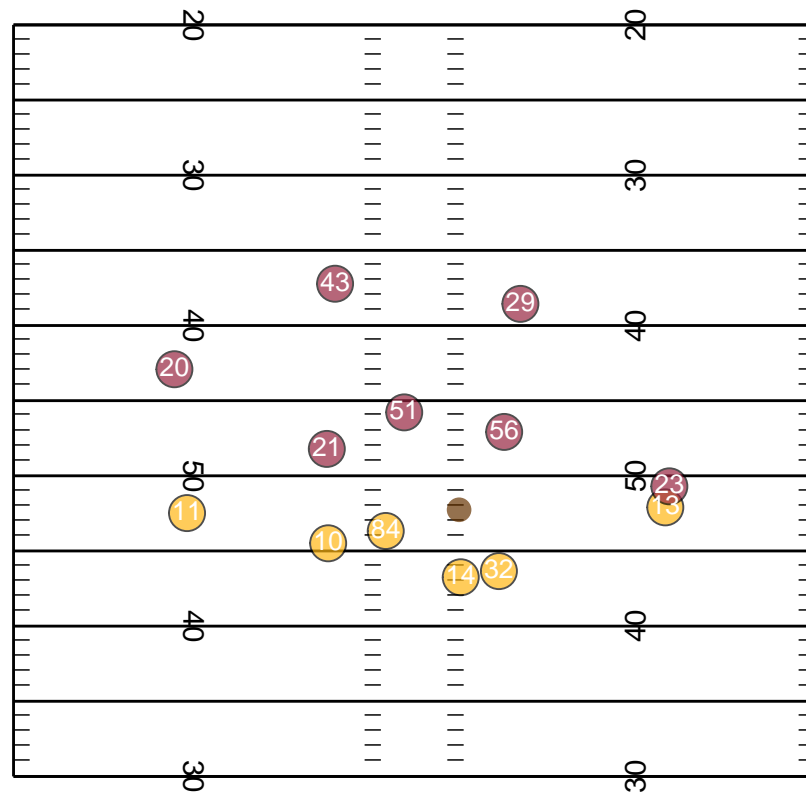
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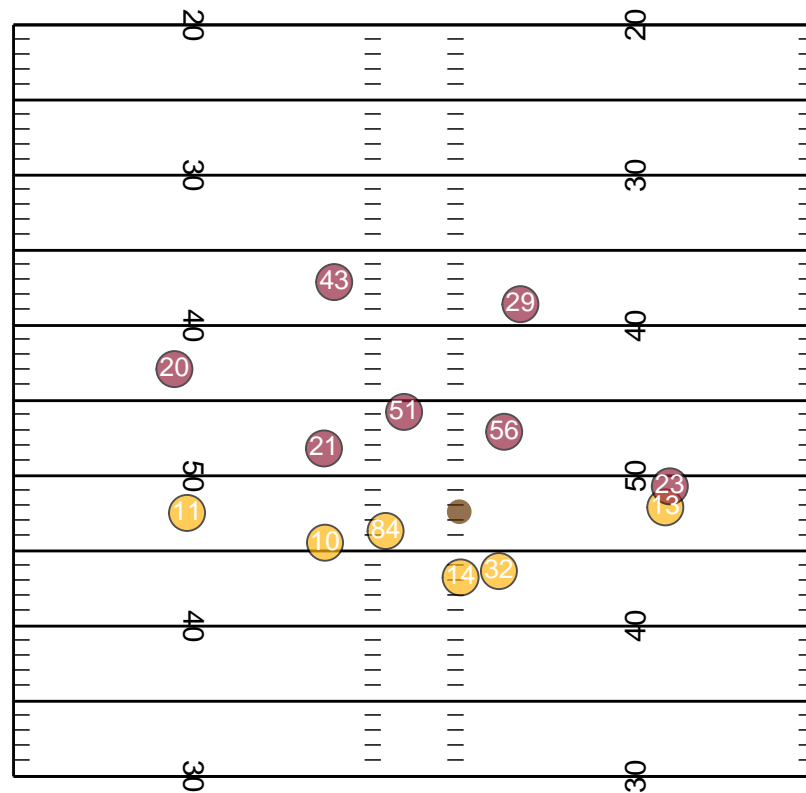
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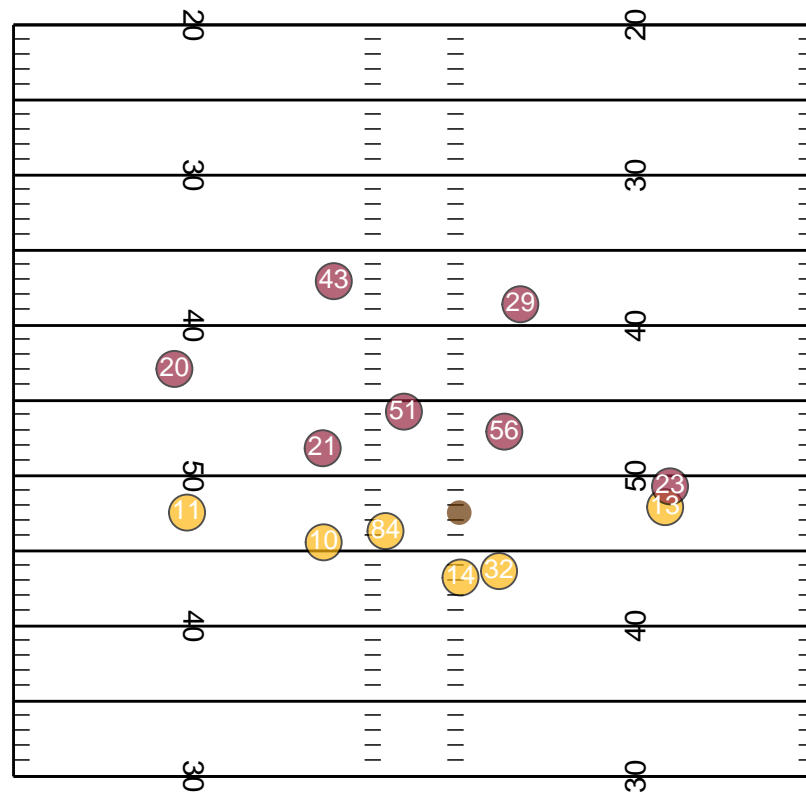
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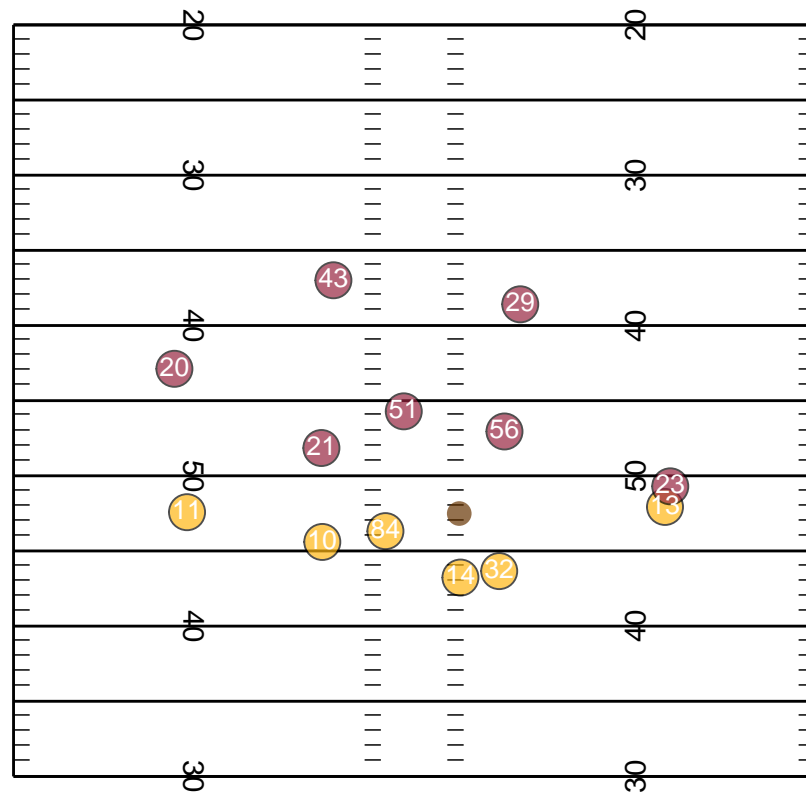


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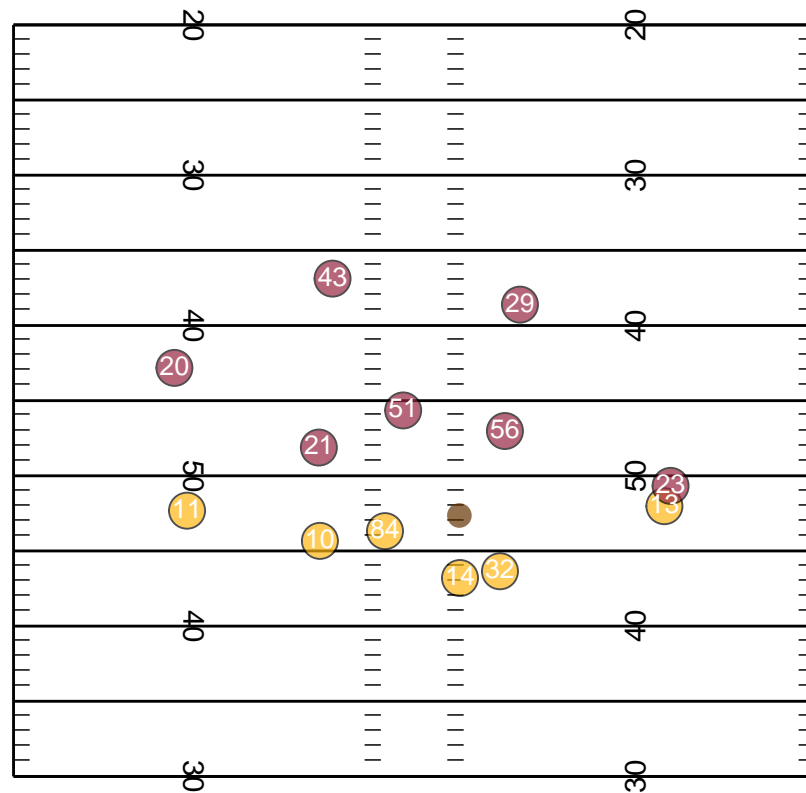
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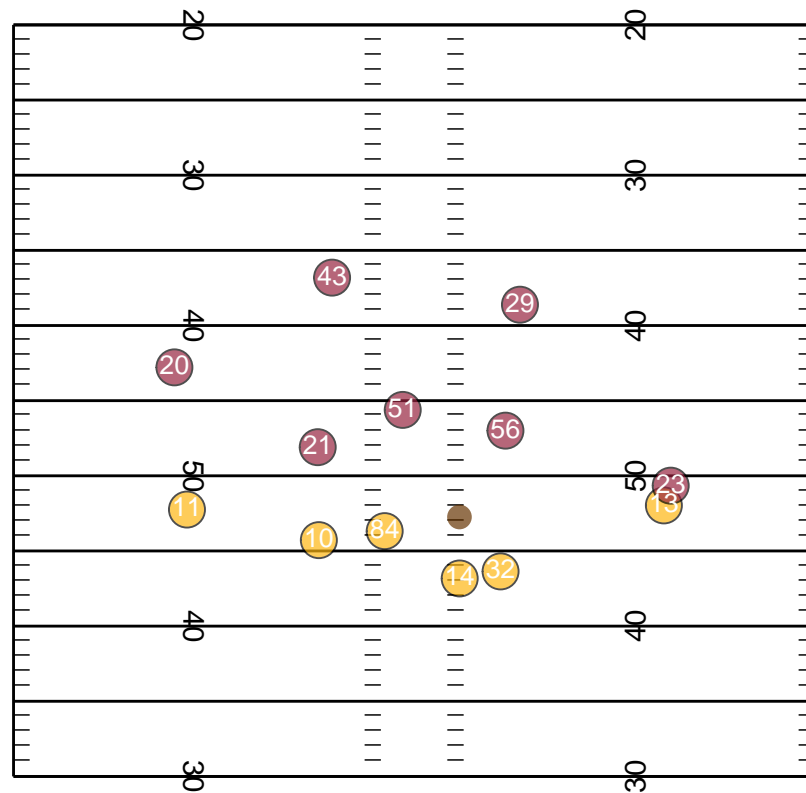
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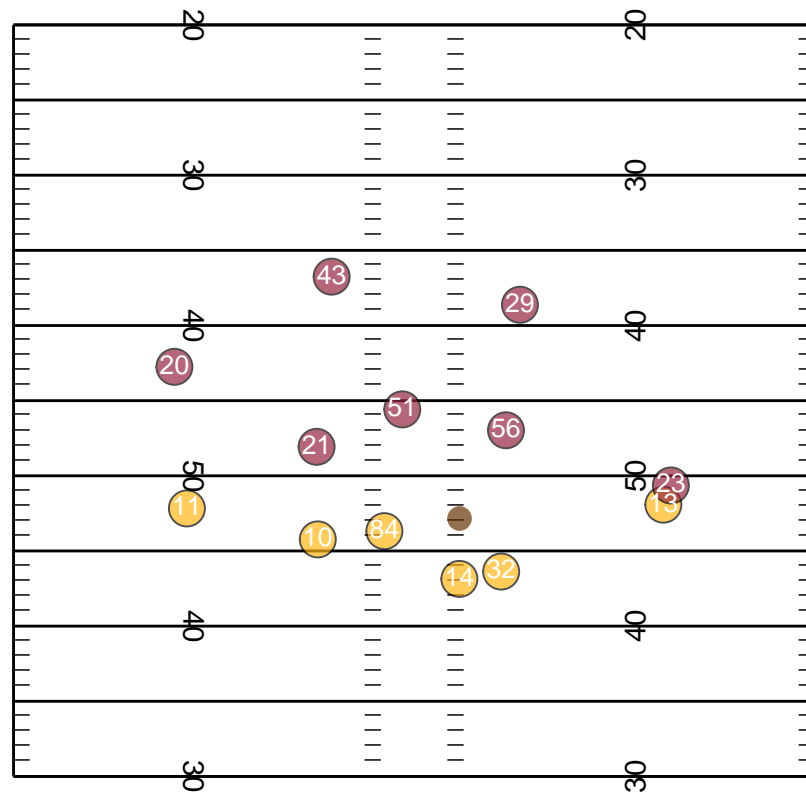
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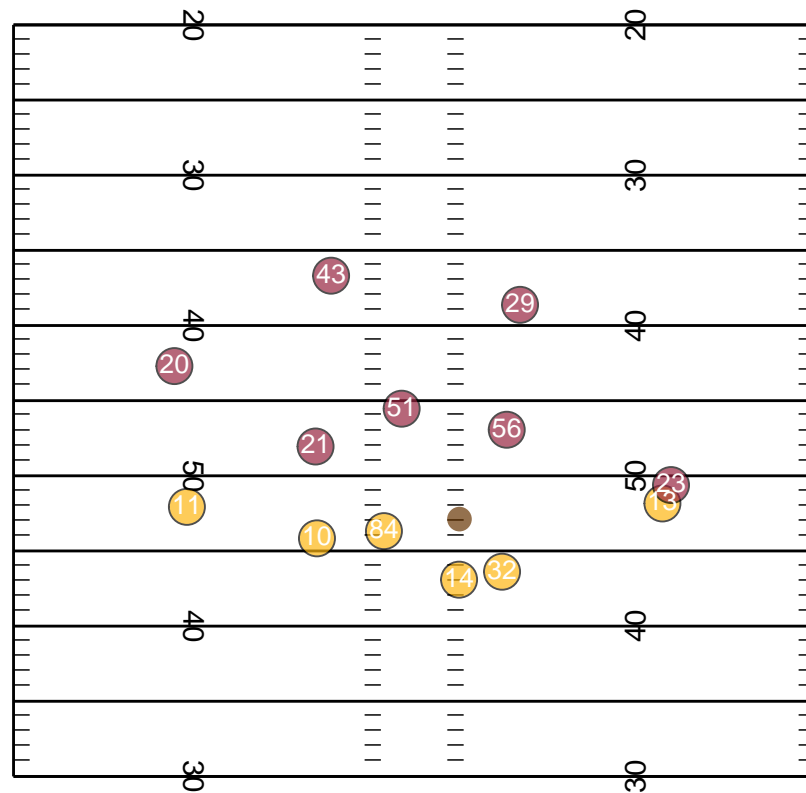
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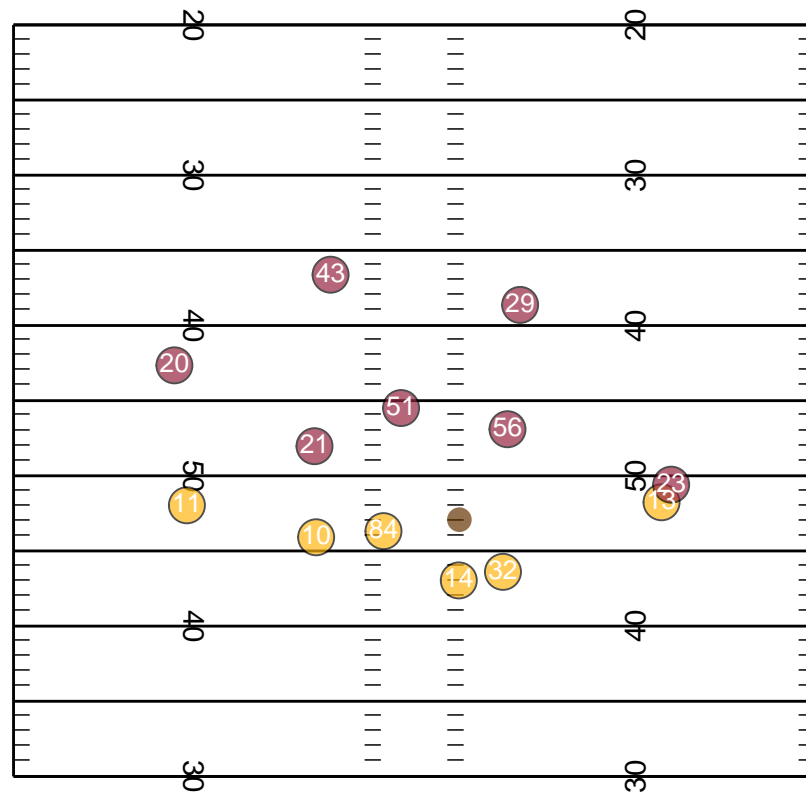
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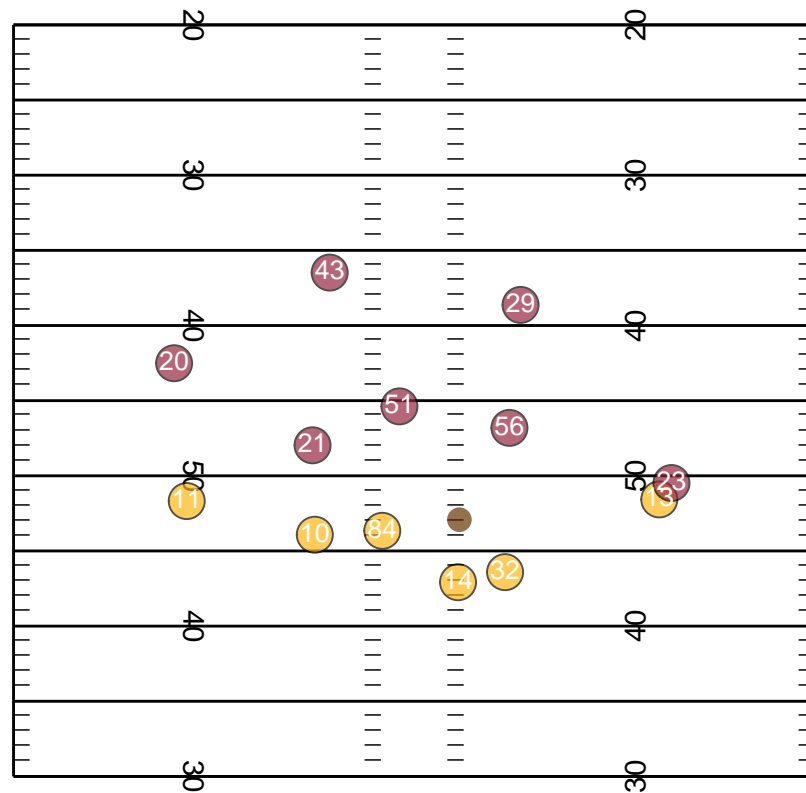
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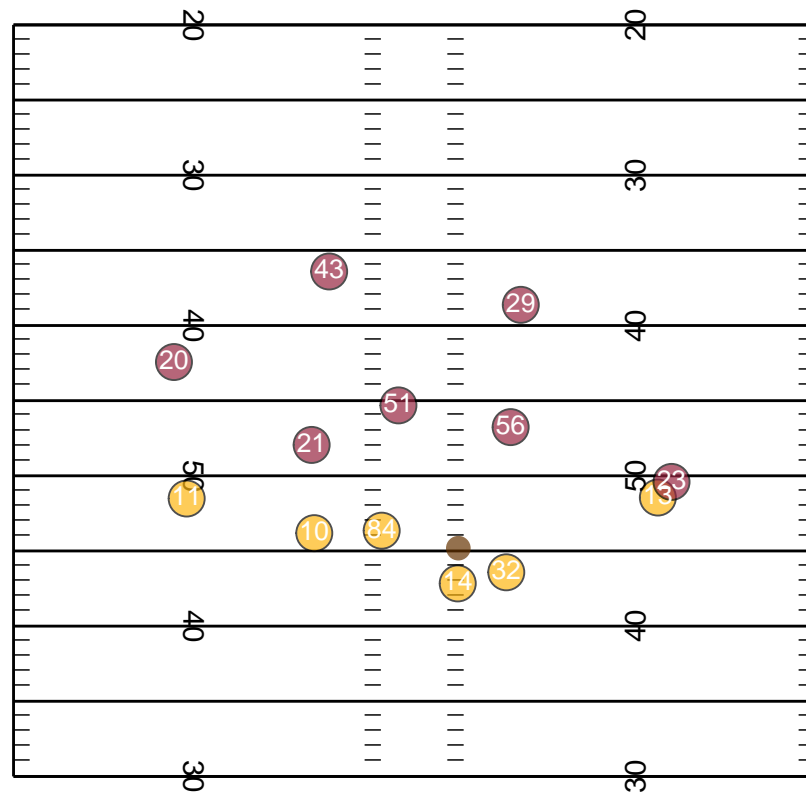
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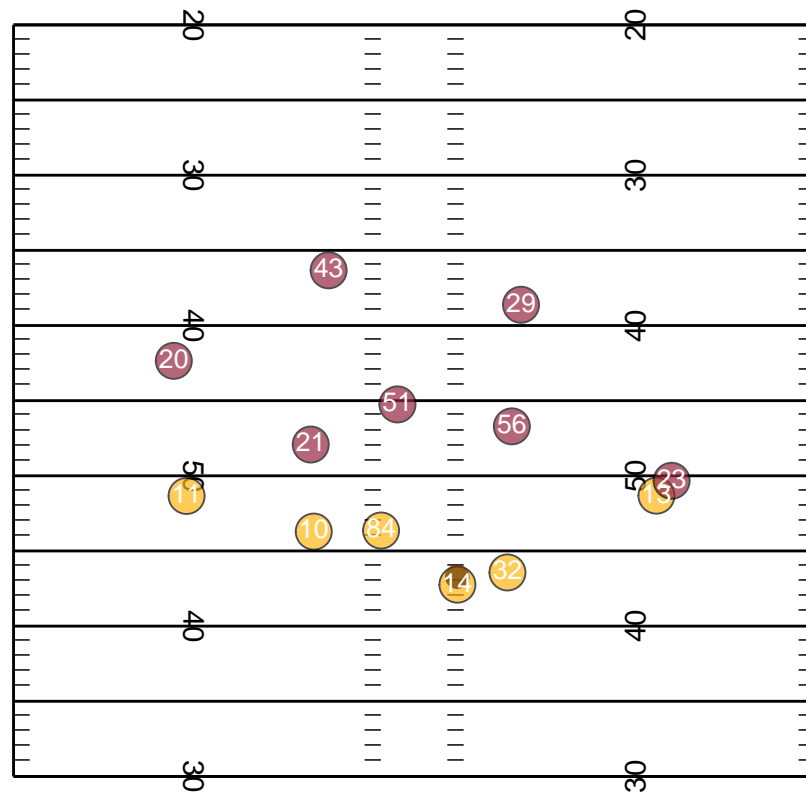


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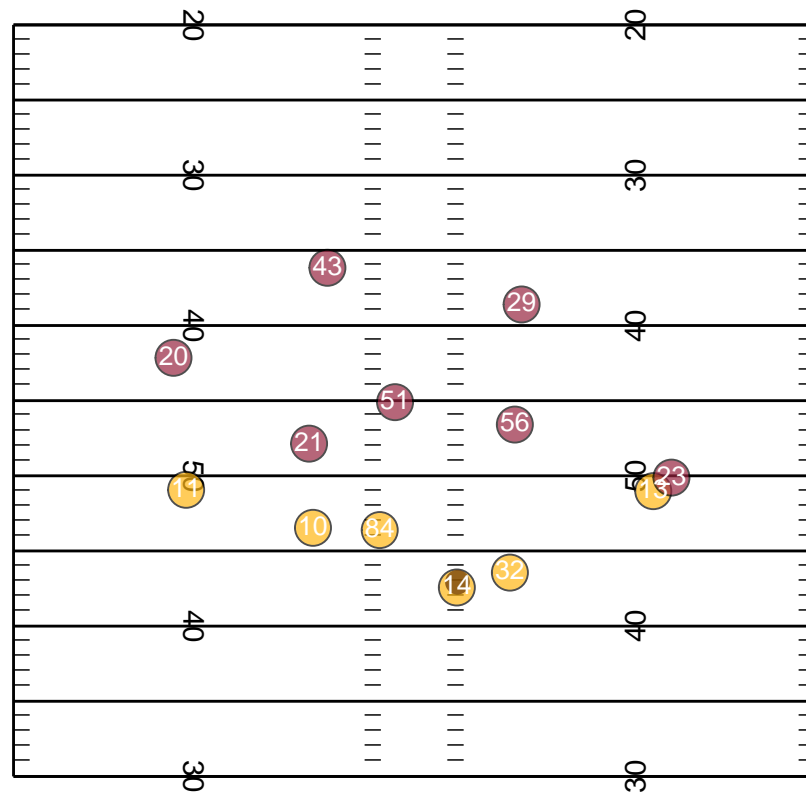
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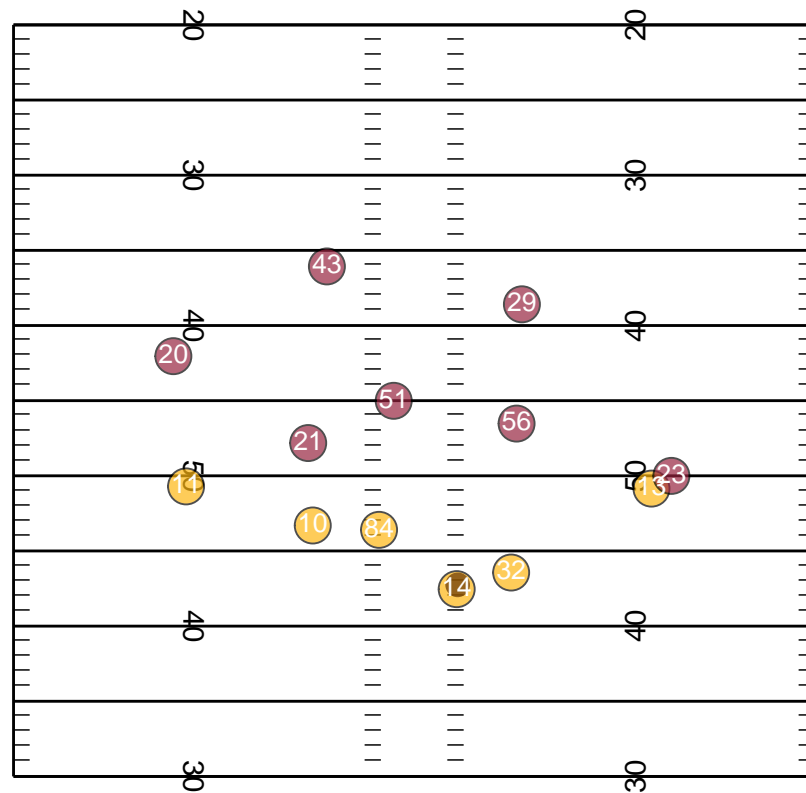
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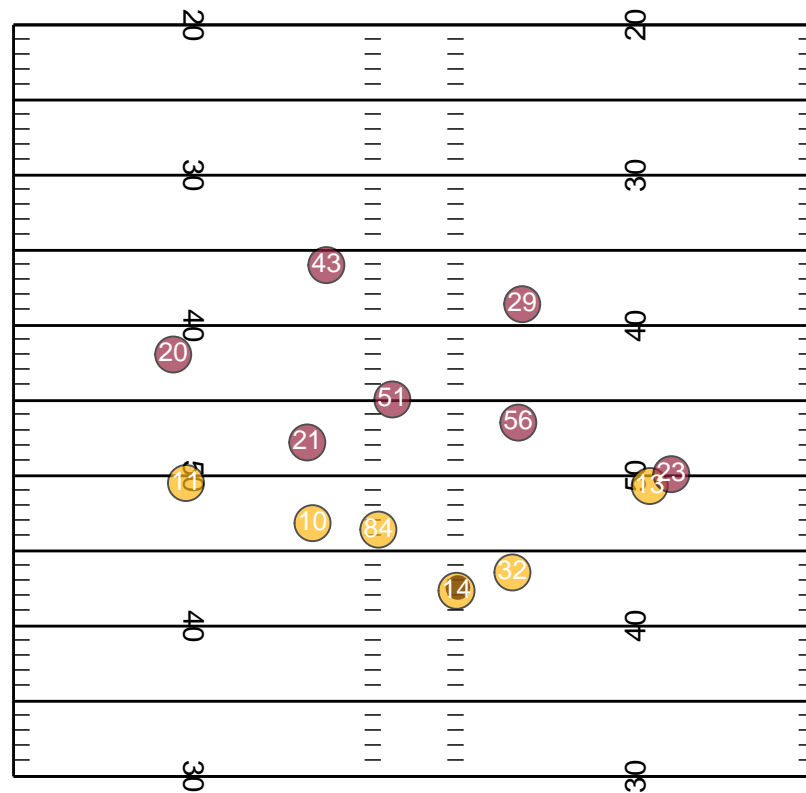
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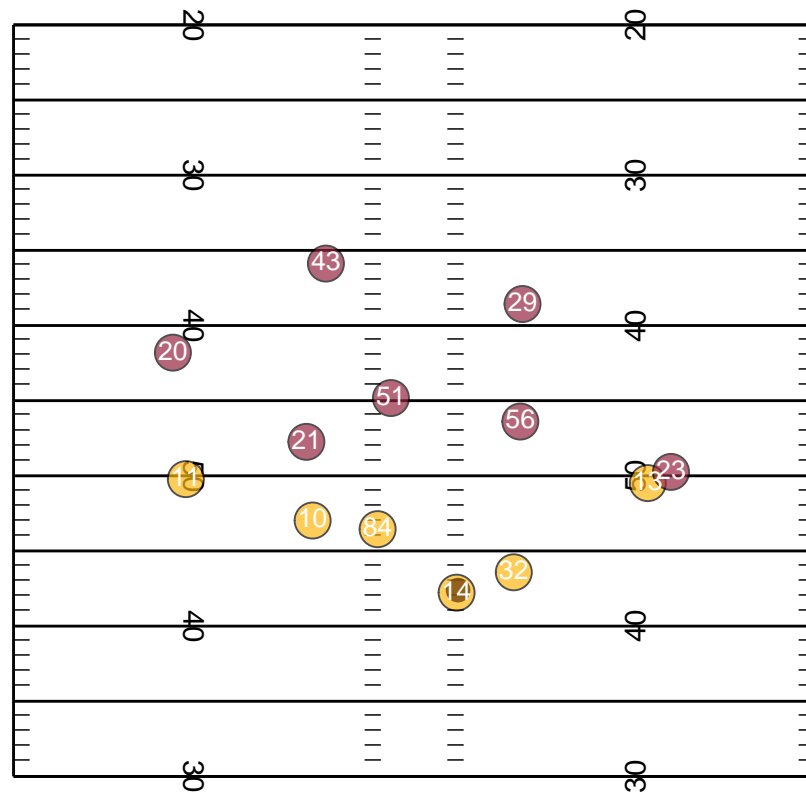
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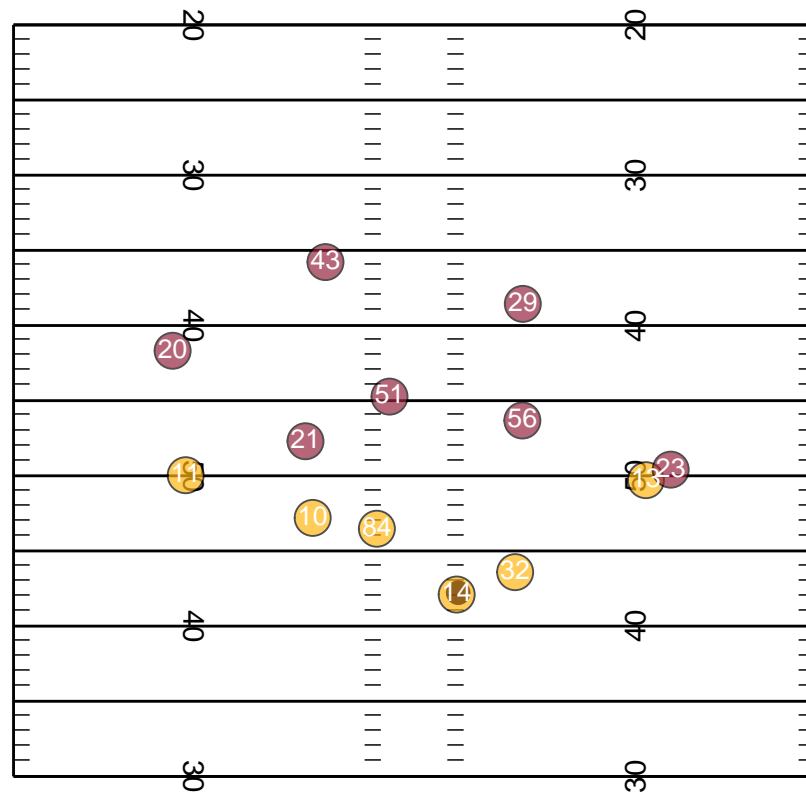
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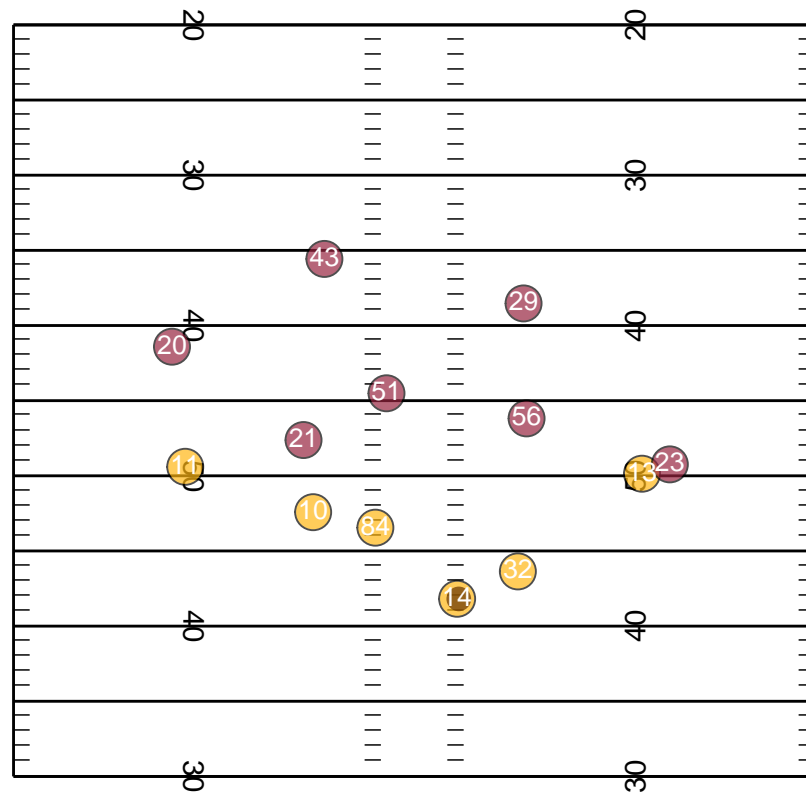
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

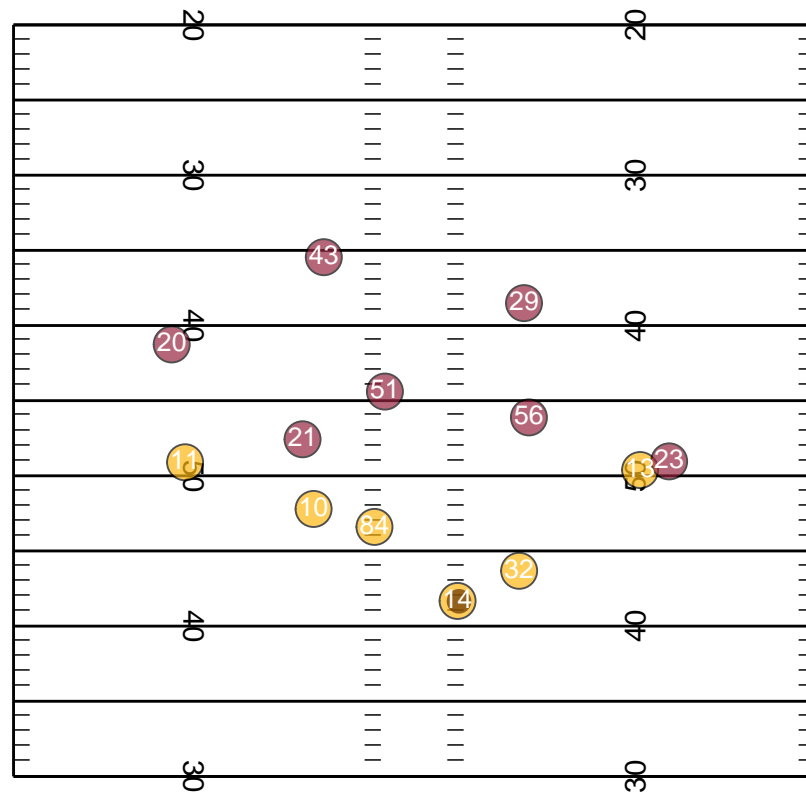
t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

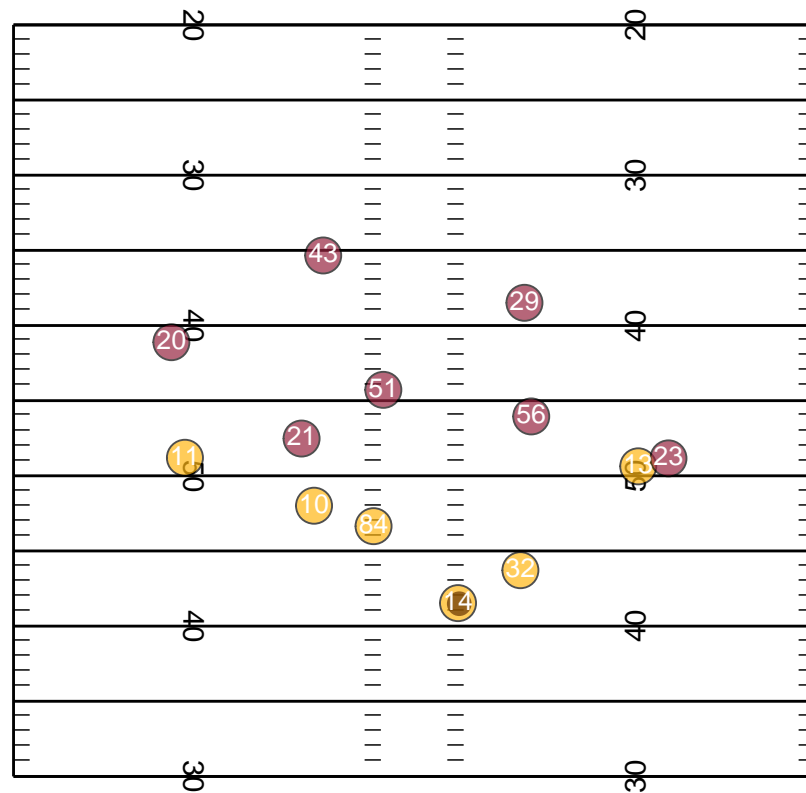


t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



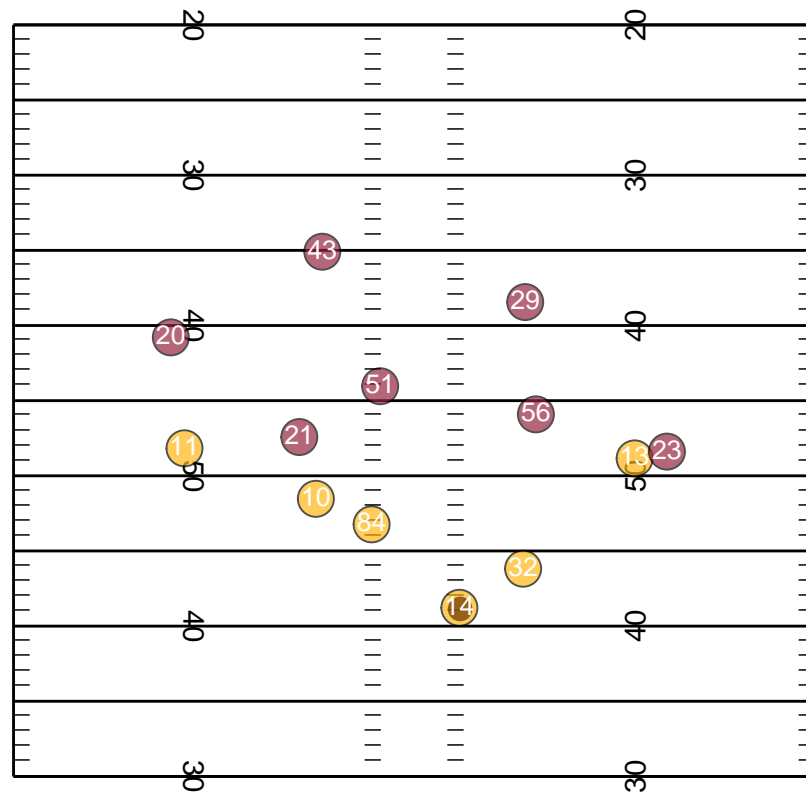
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

† to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



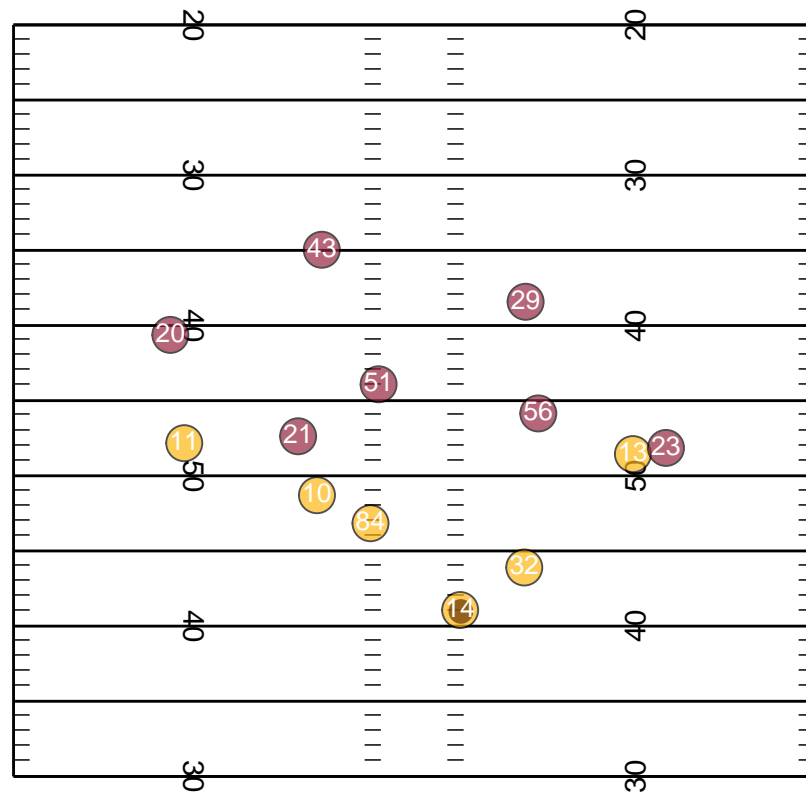
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



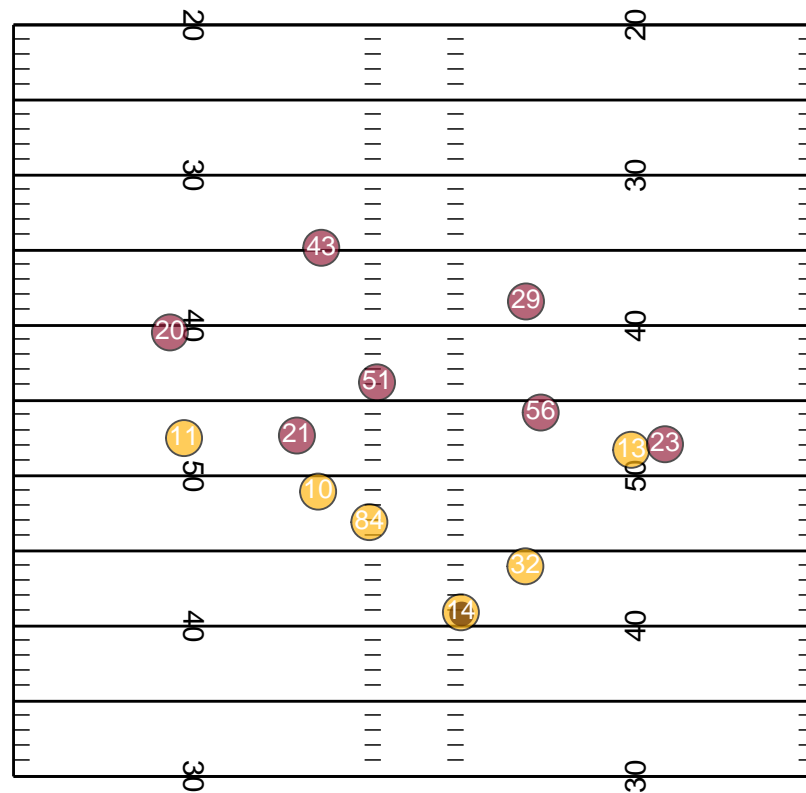
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



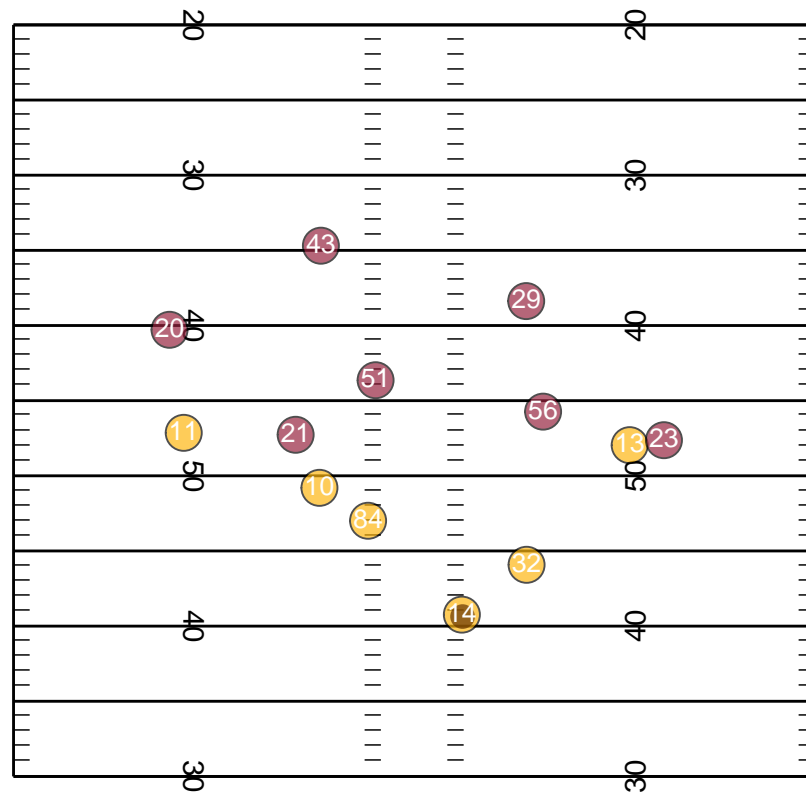
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



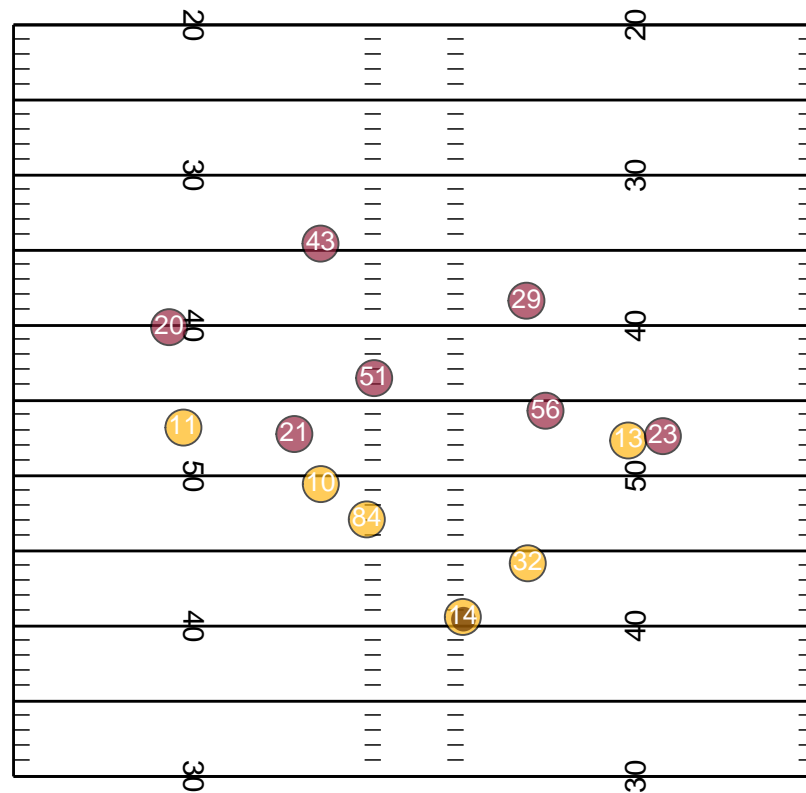
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



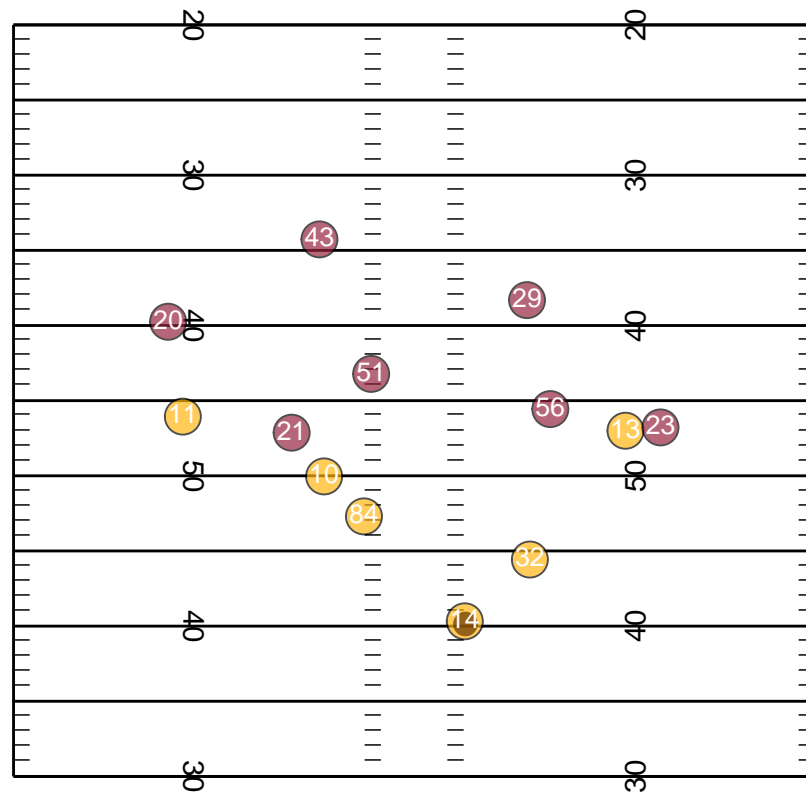
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

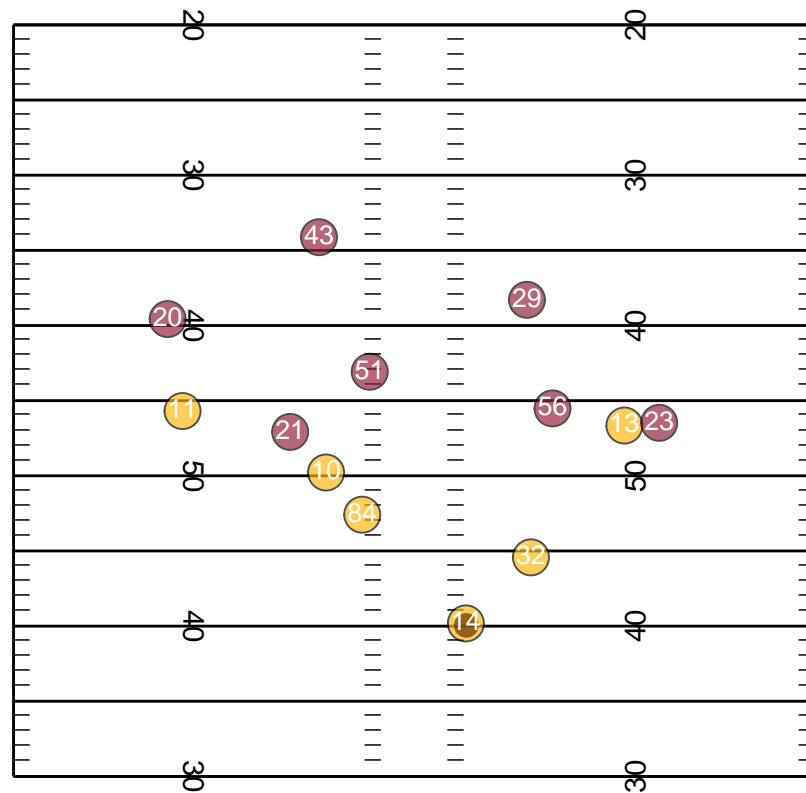
t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

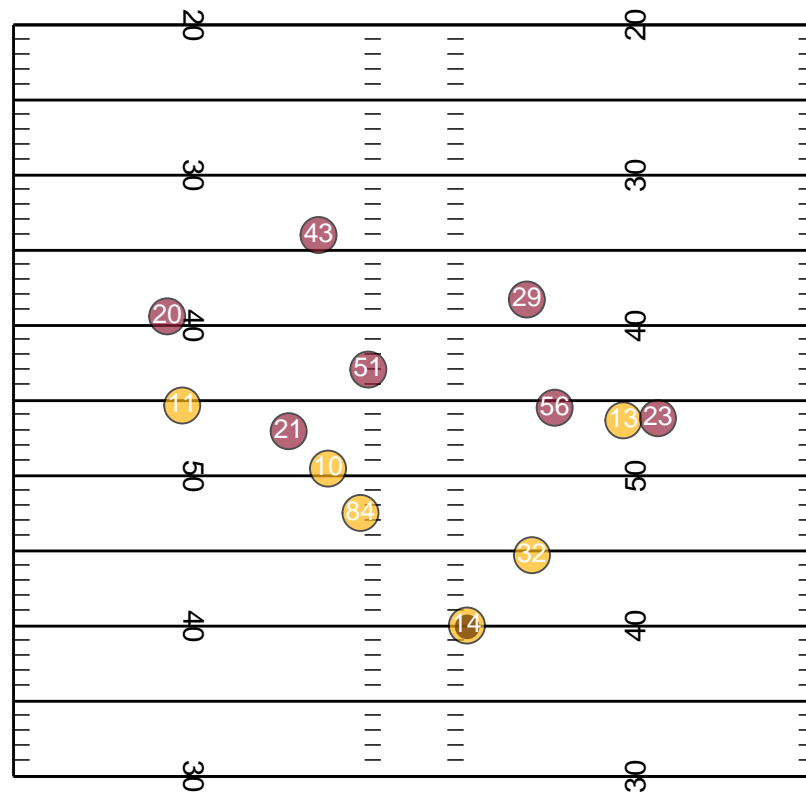


† to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



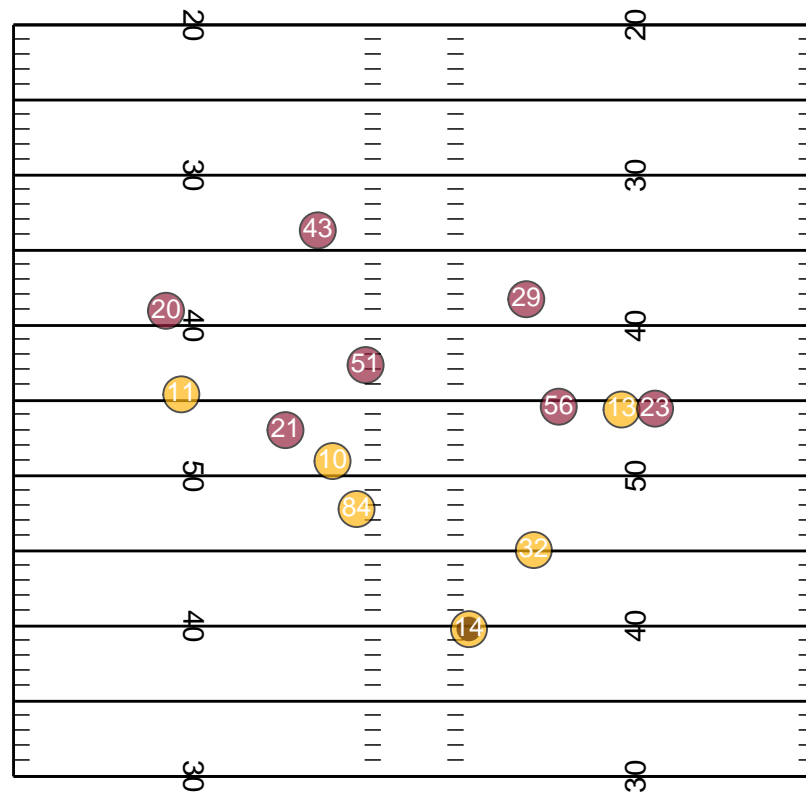
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



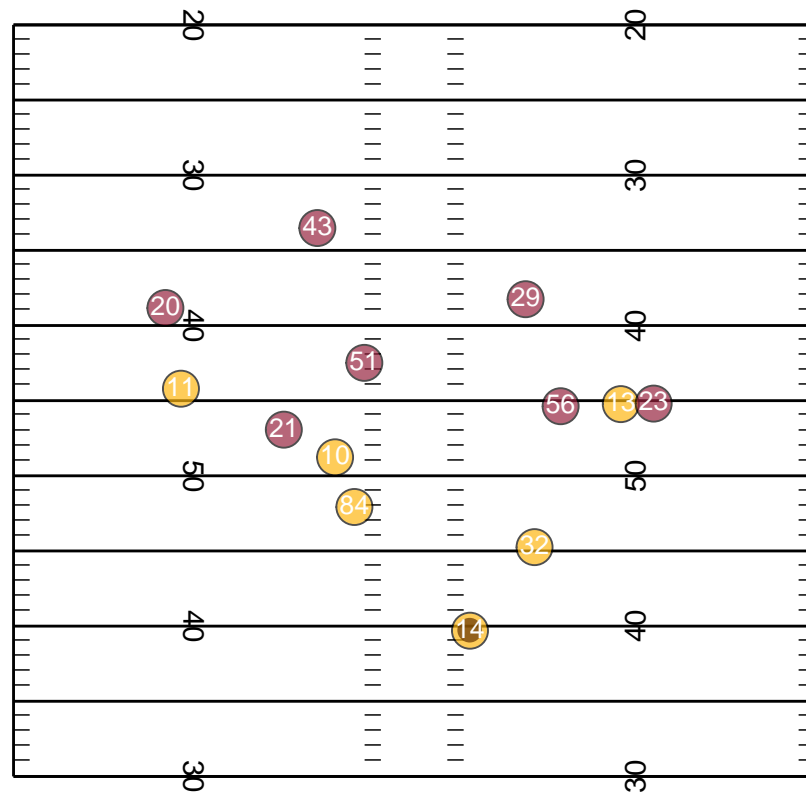
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



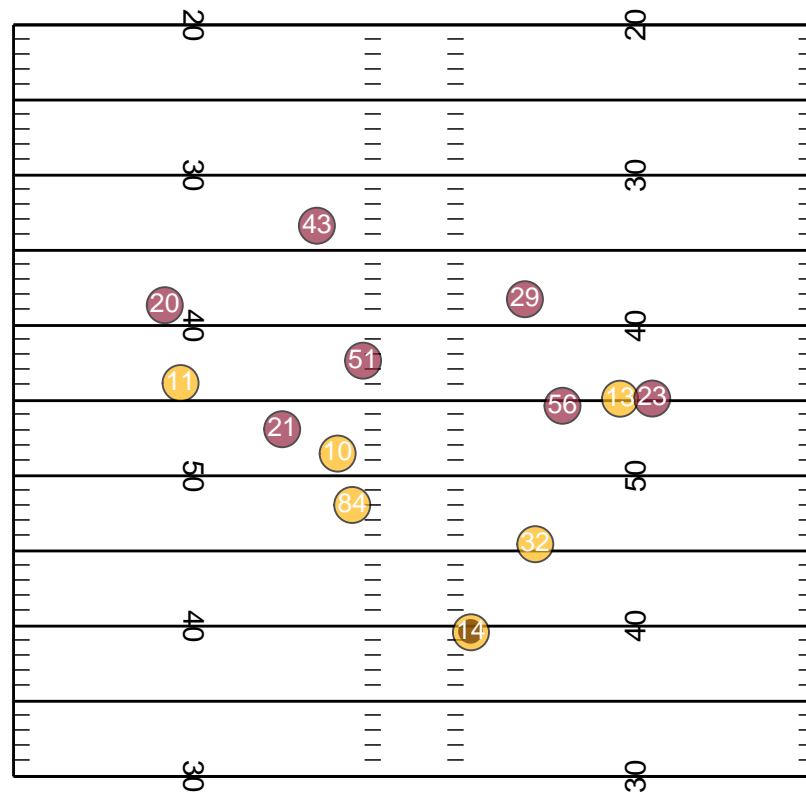
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



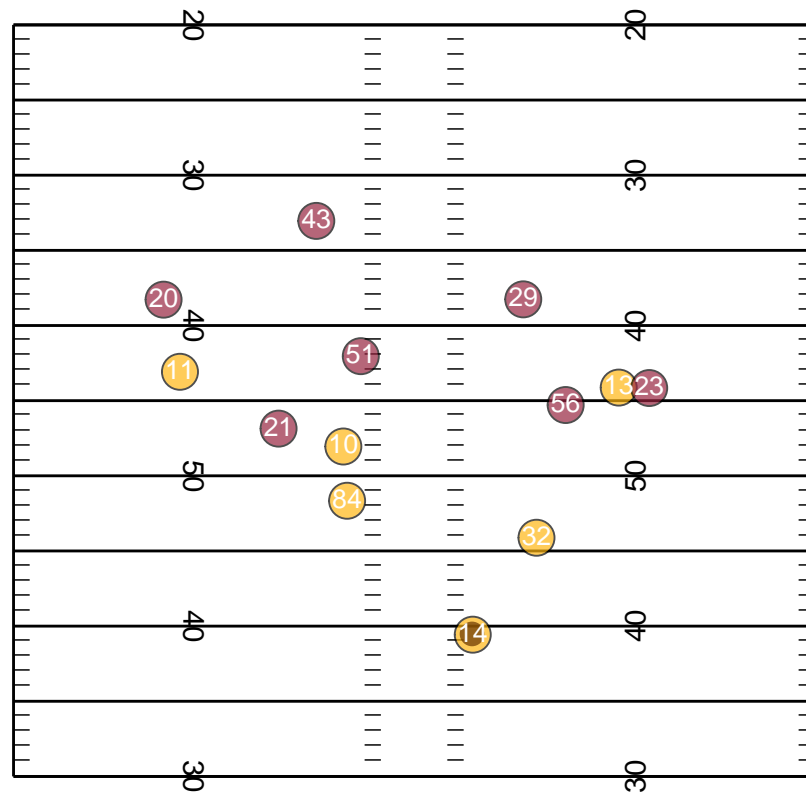
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



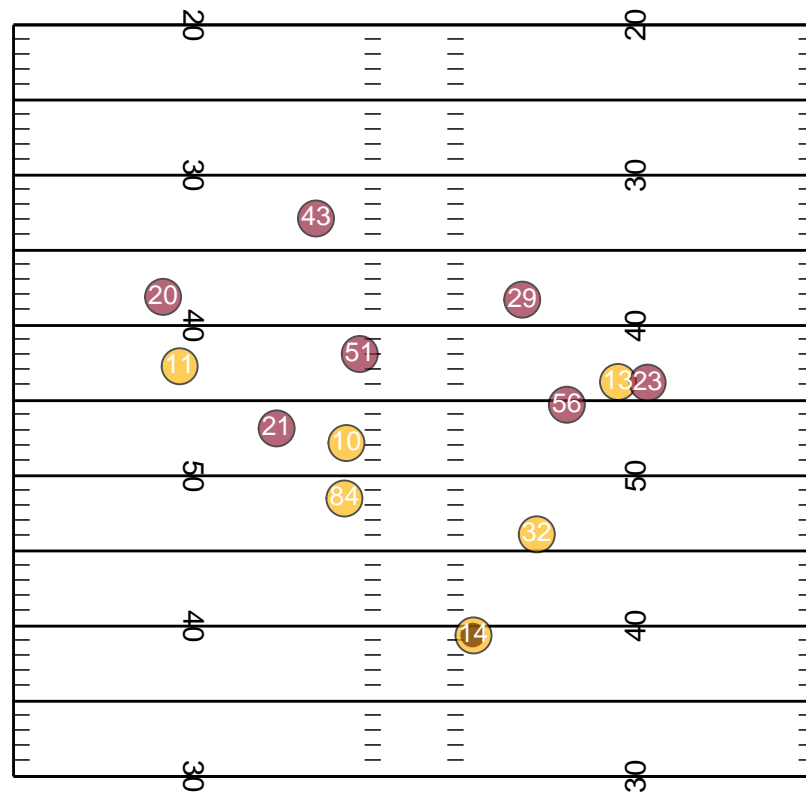
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



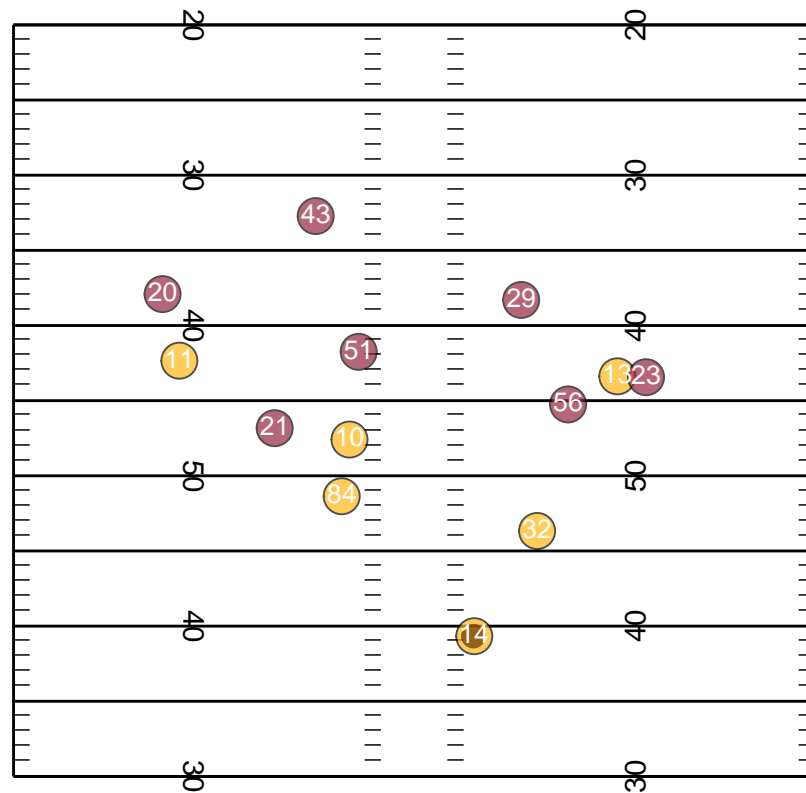
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

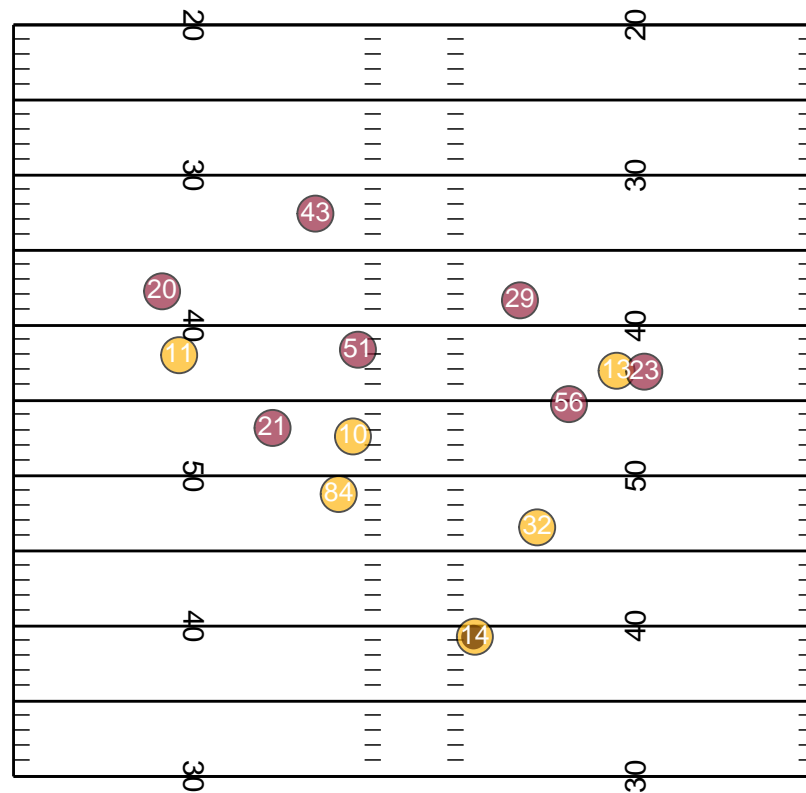
t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

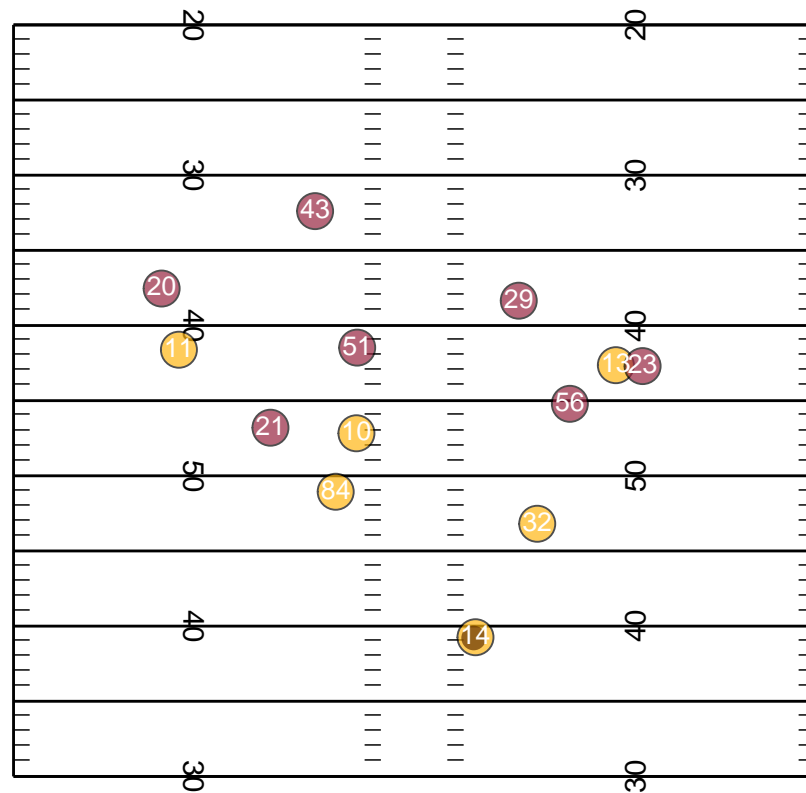


t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



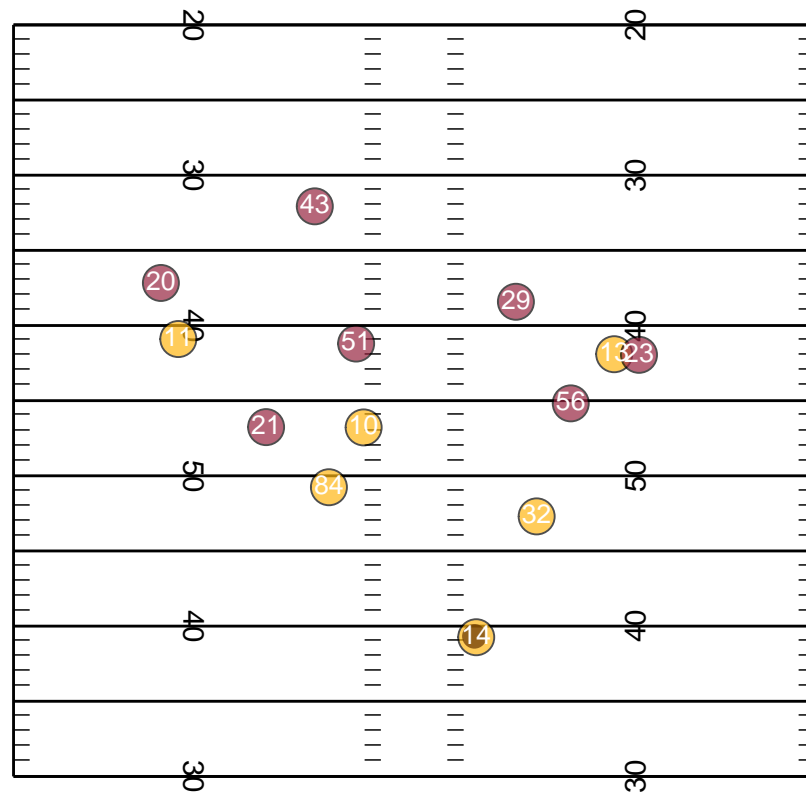
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



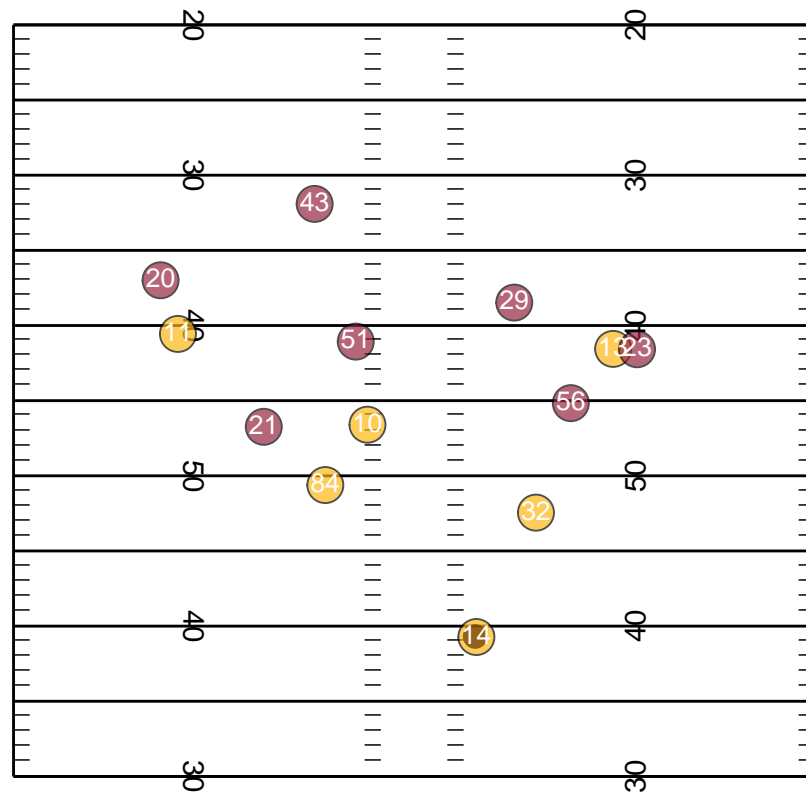
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

† to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



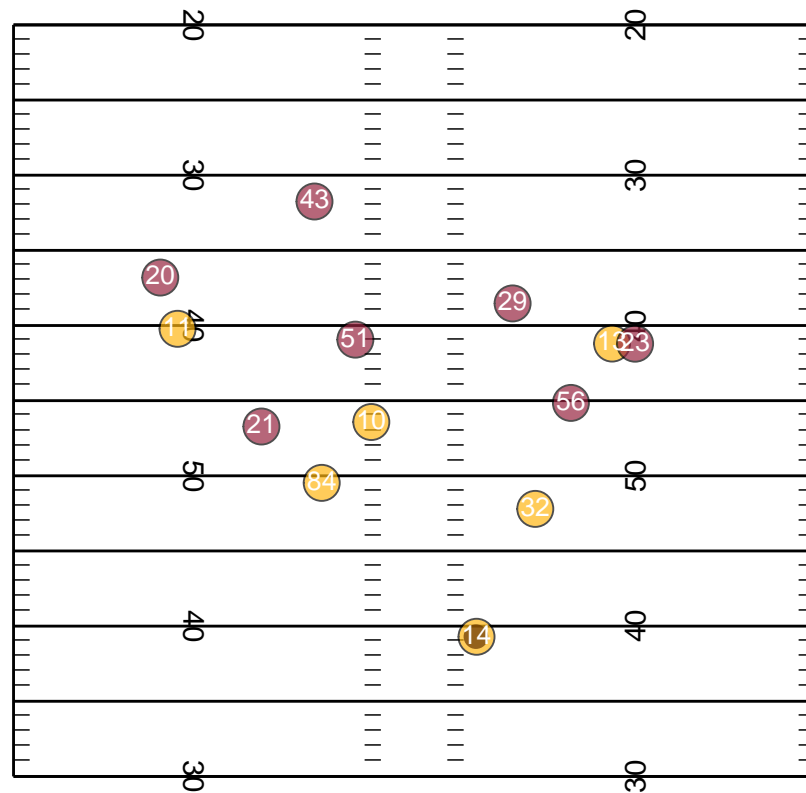
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



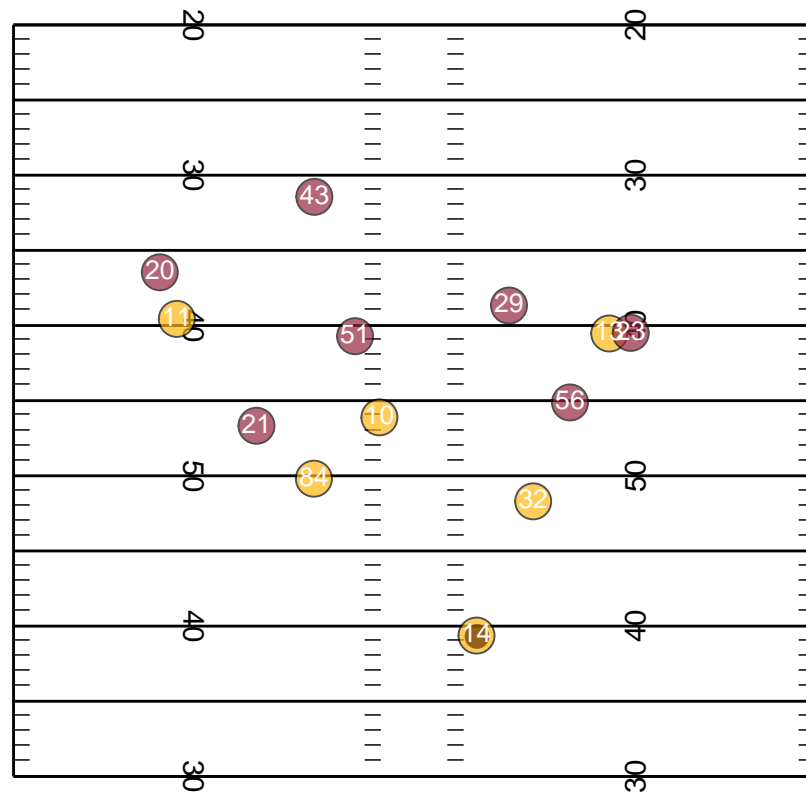
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



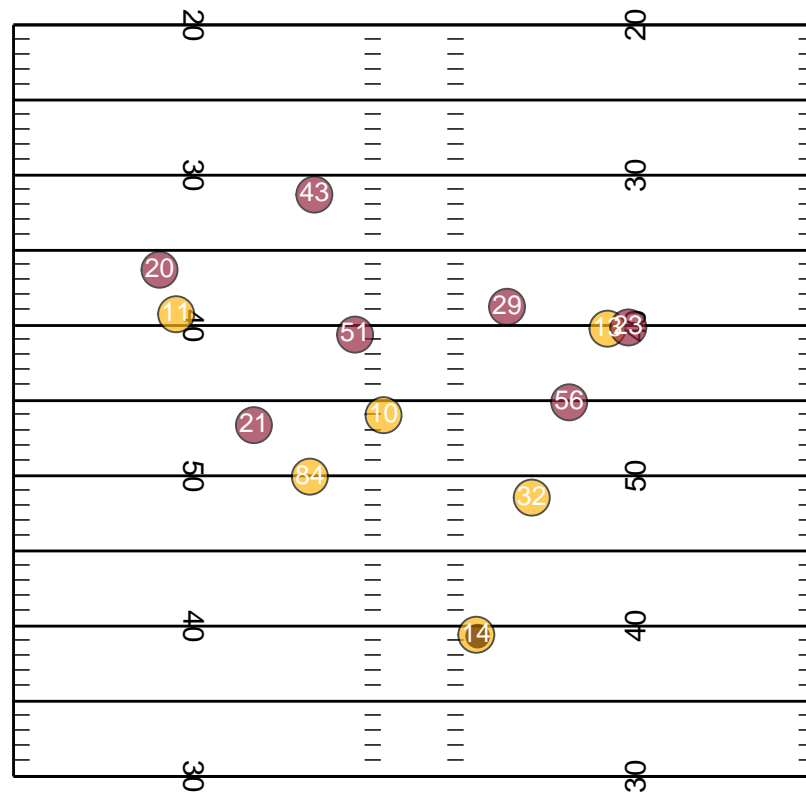
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



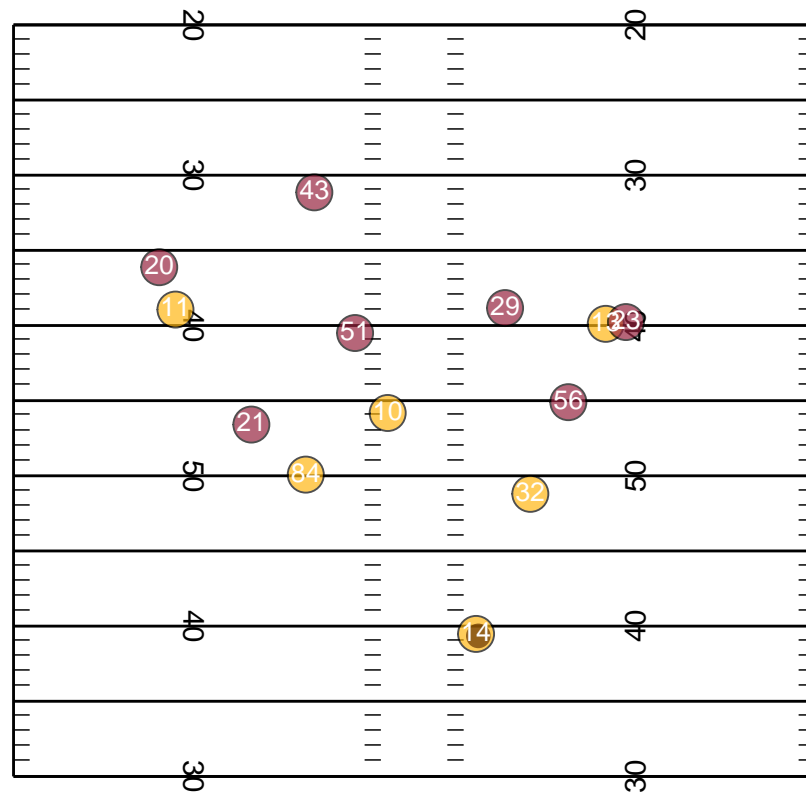
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

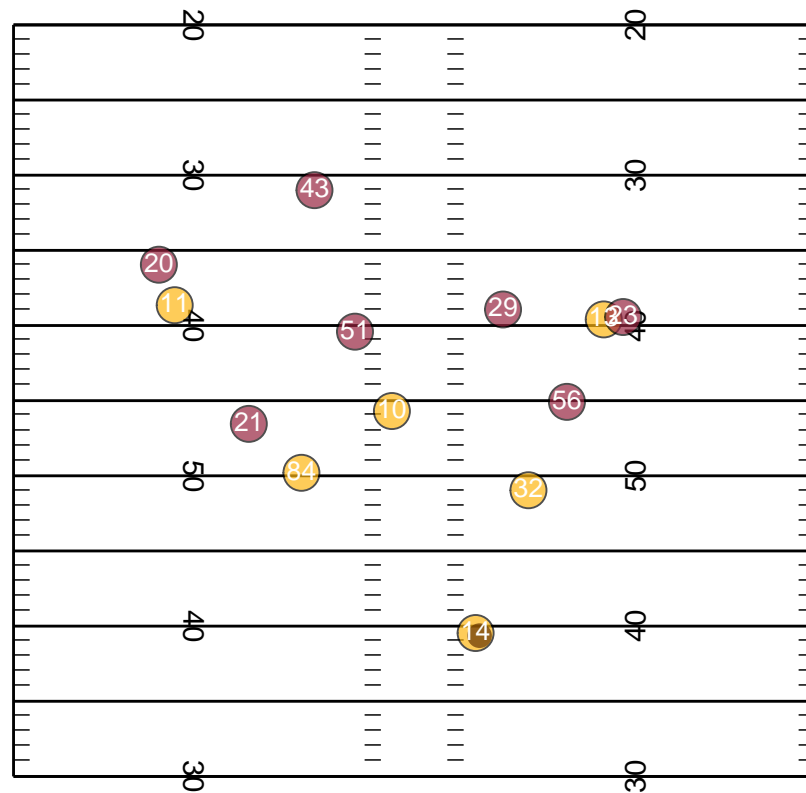
t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

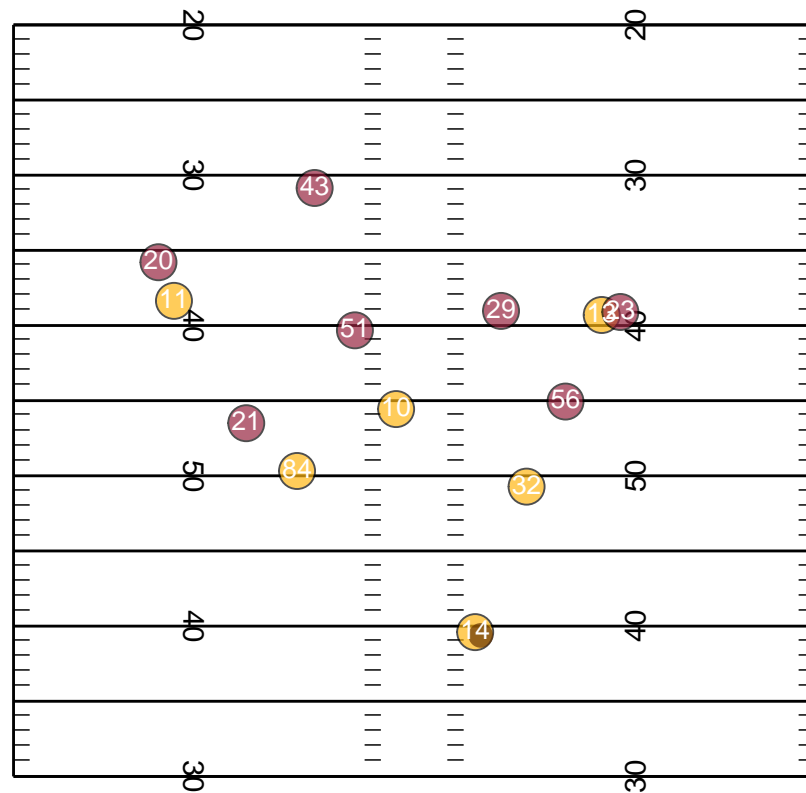


t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



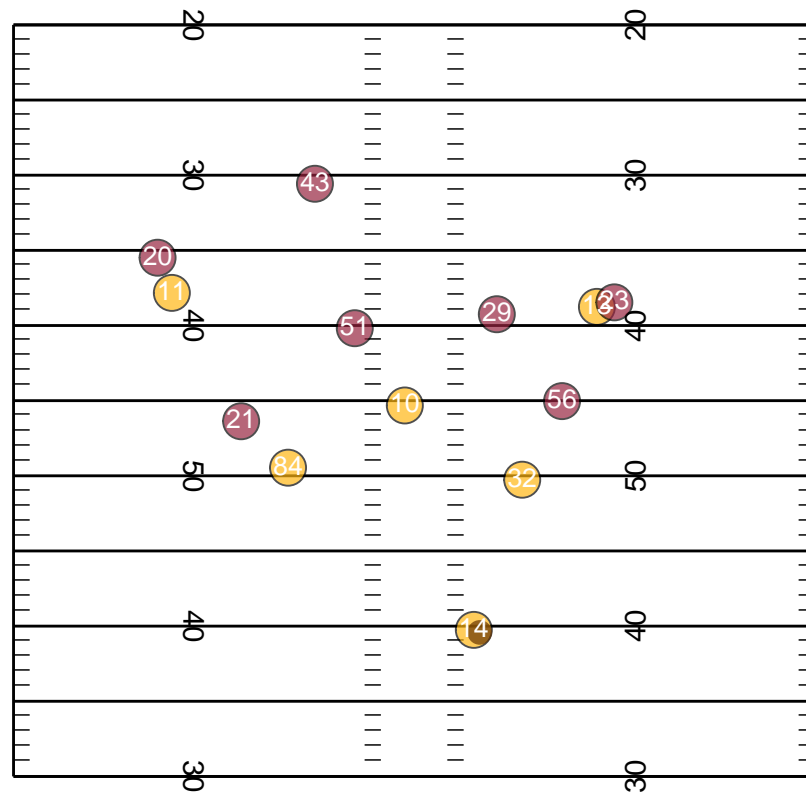
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



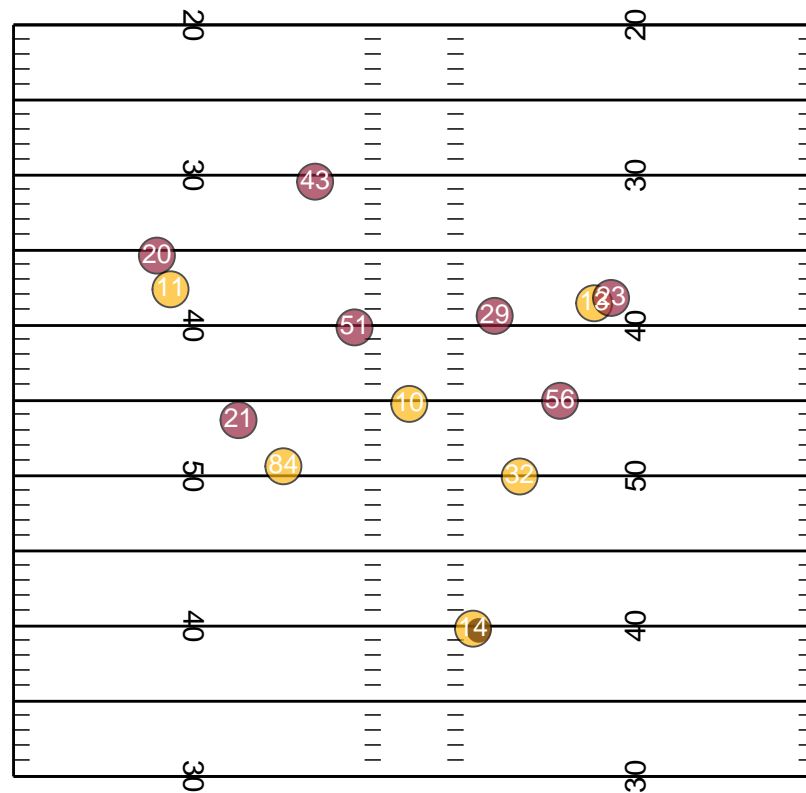
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



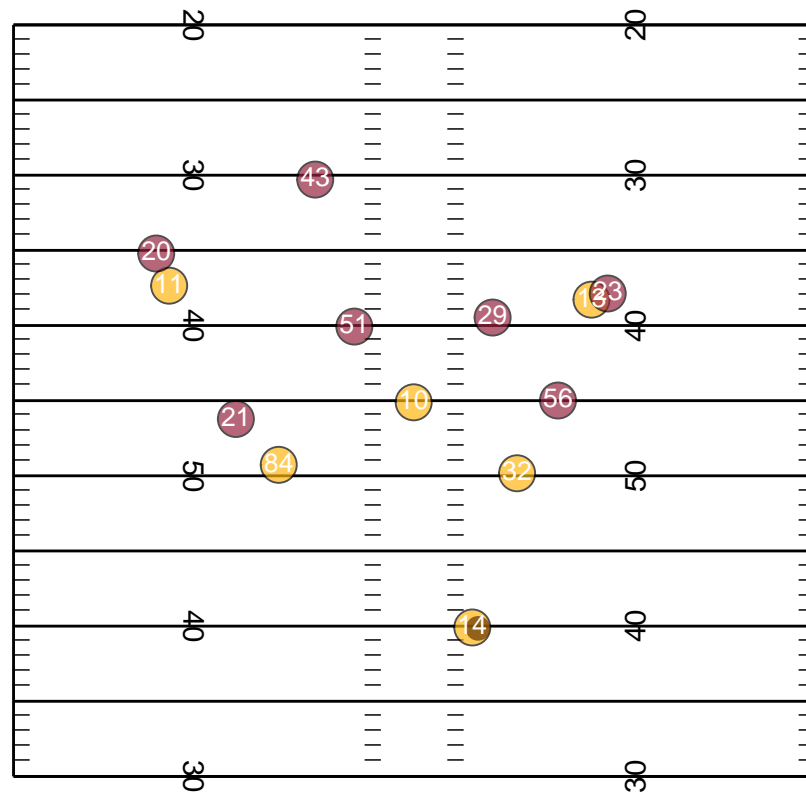
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



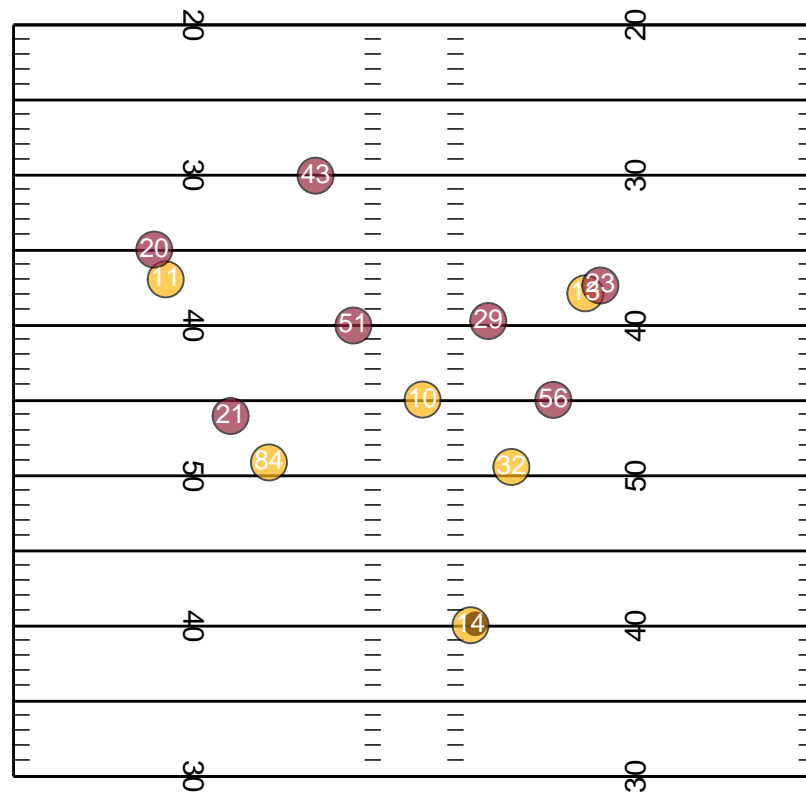
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



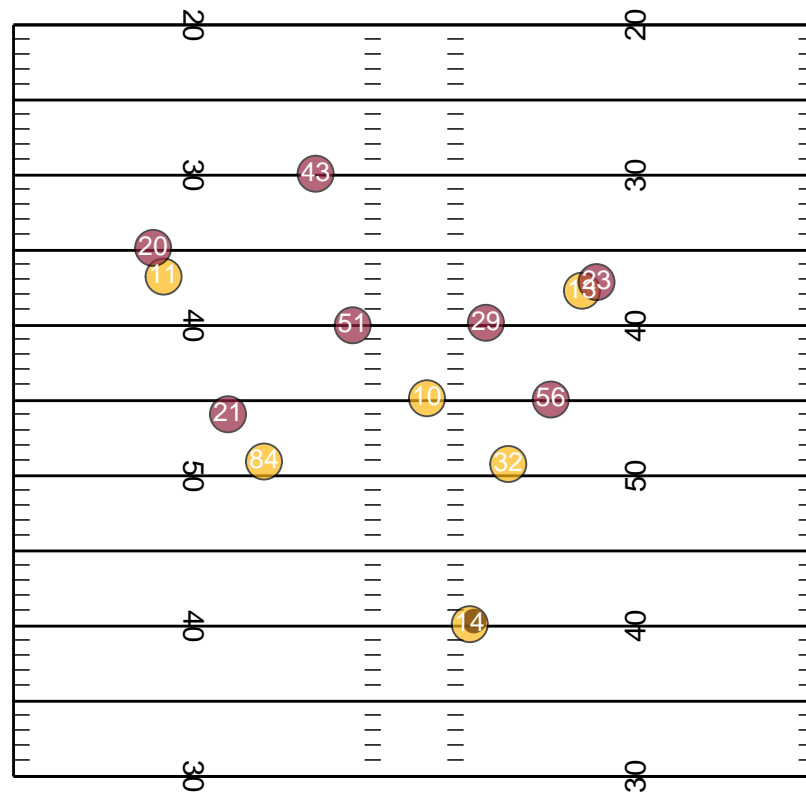
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



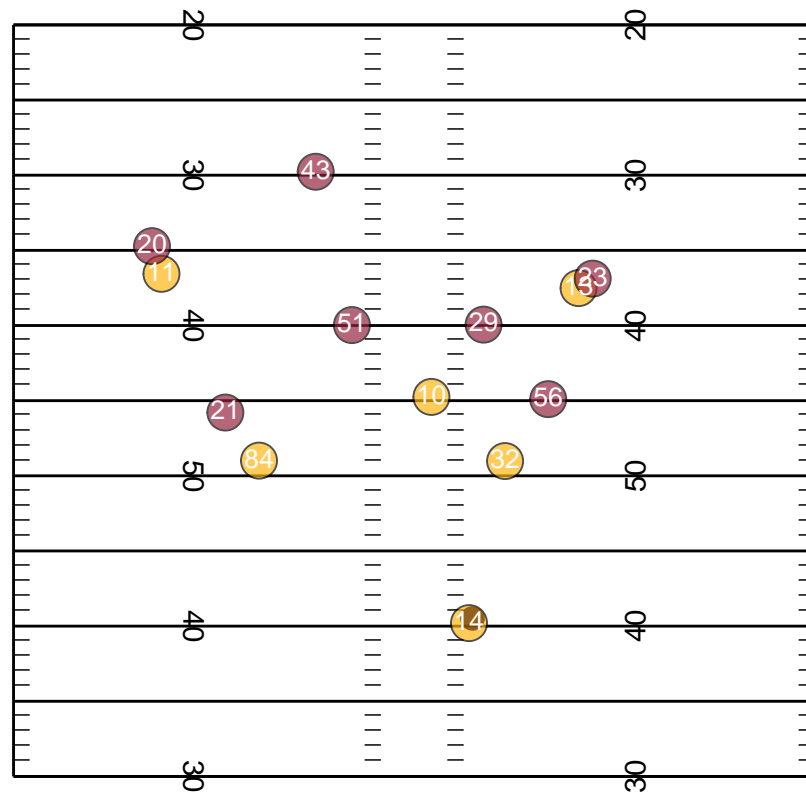
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

† to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

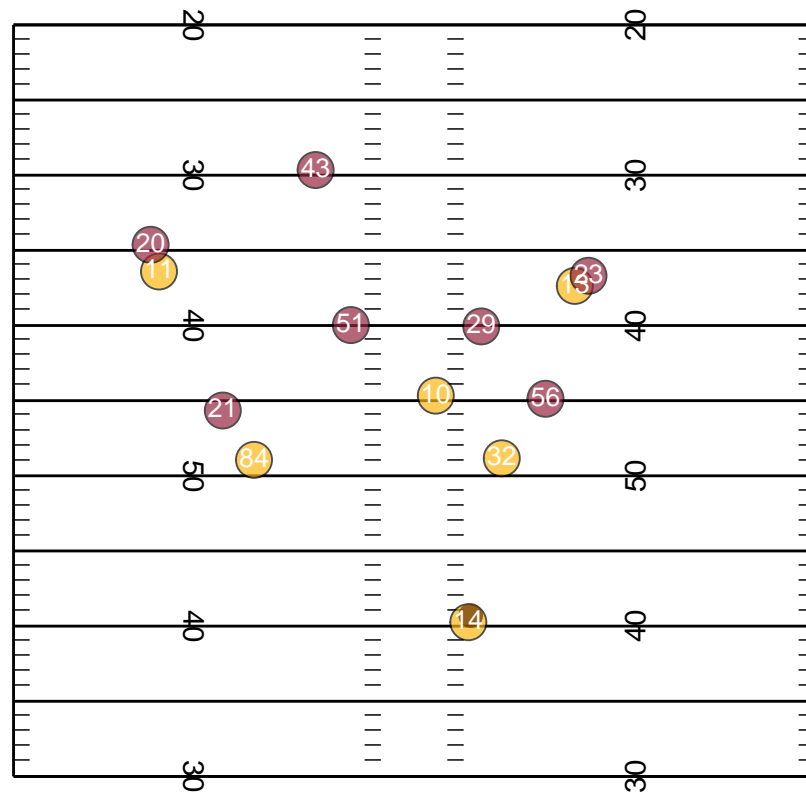
t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

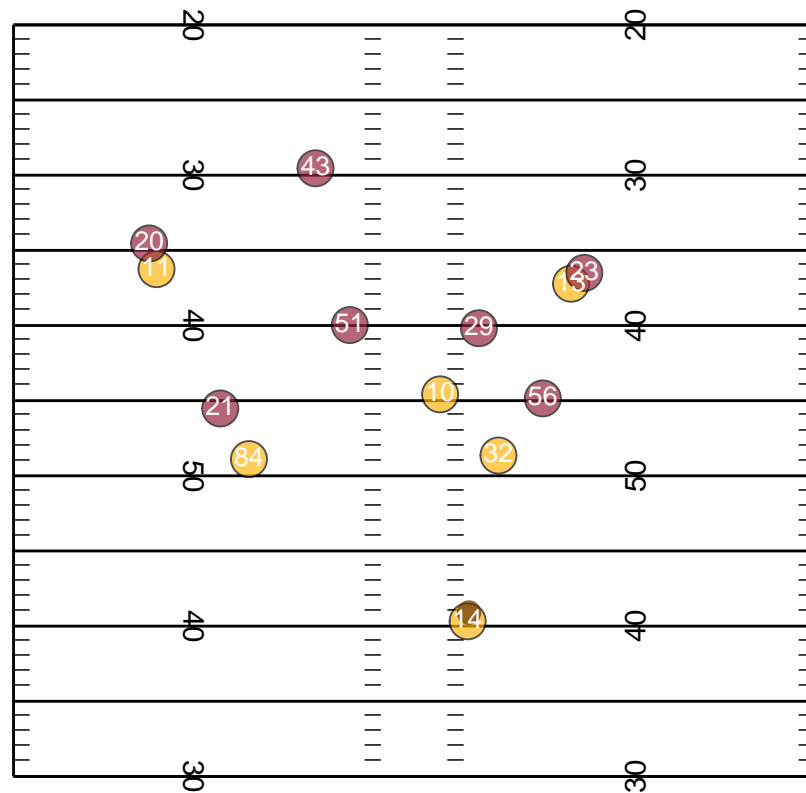


t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



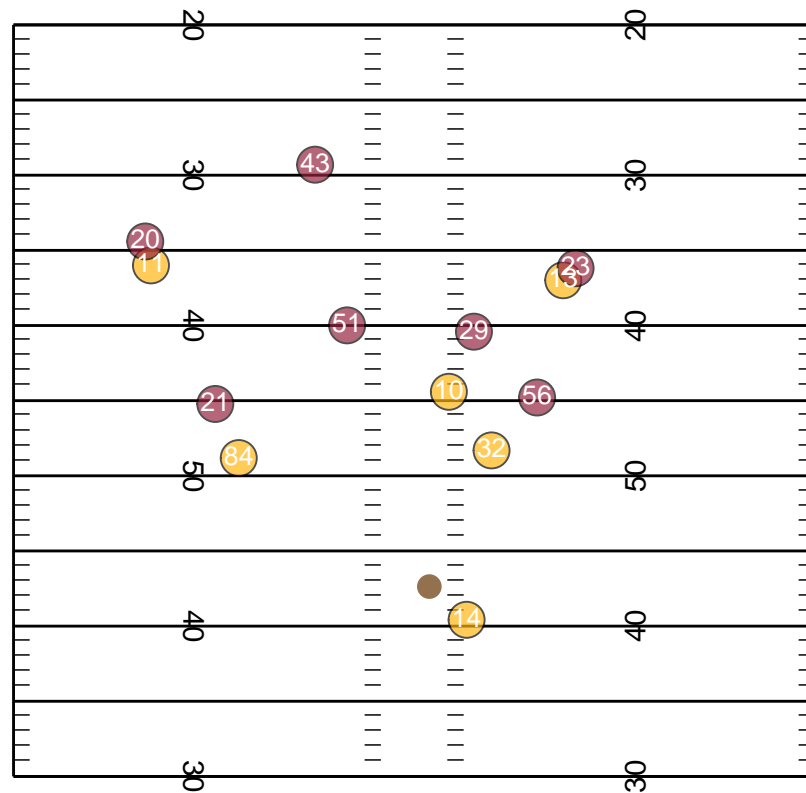
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



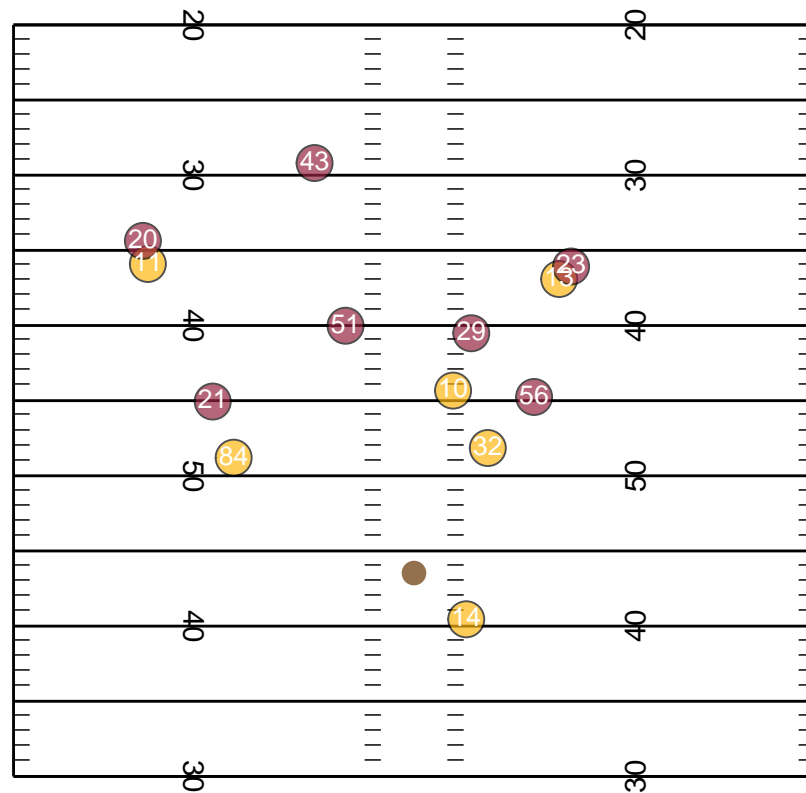
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



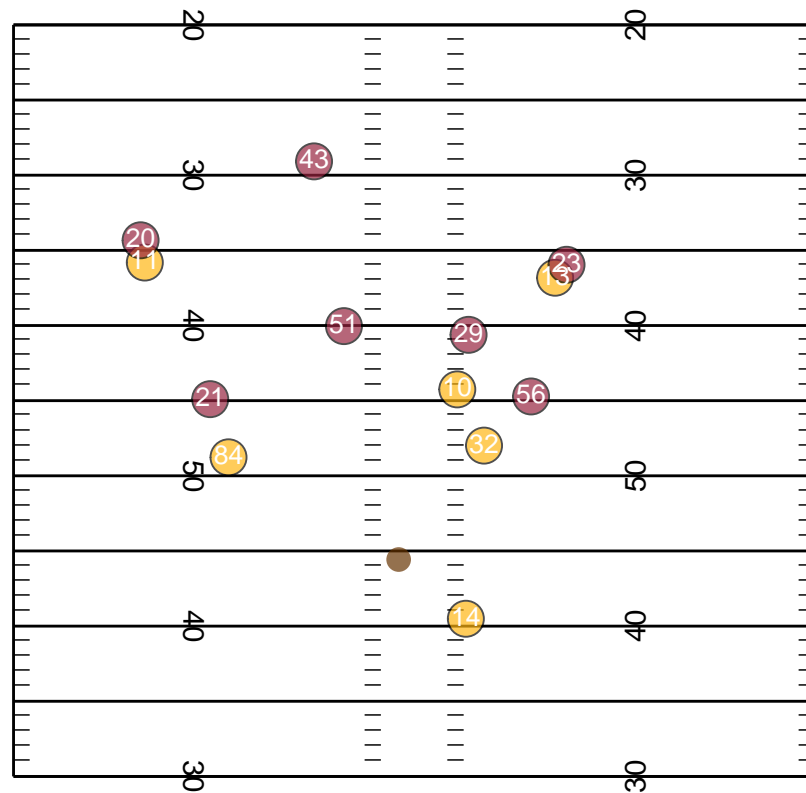
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1

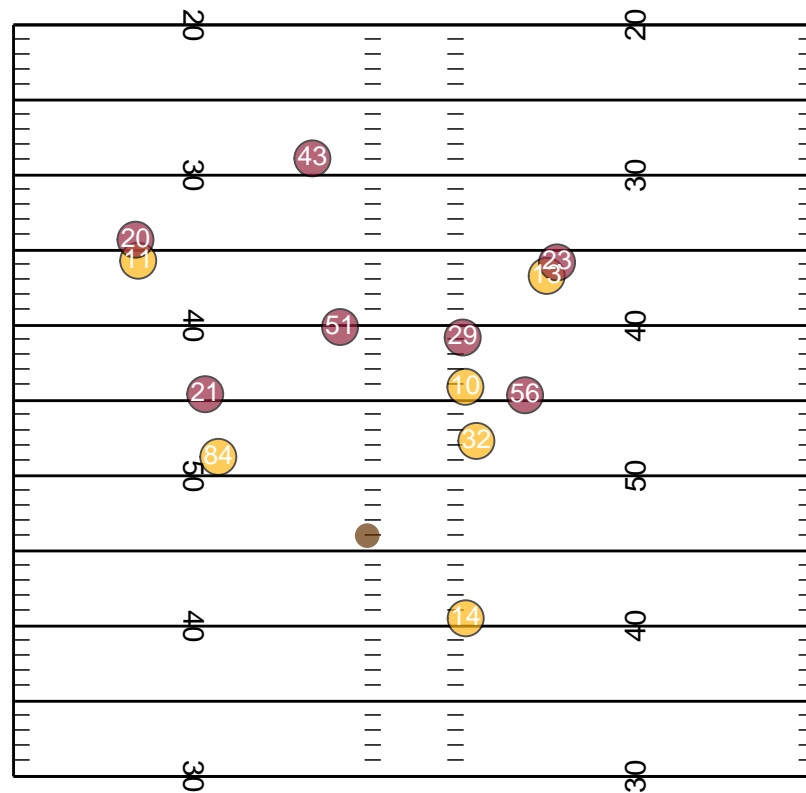


## Warning: Removed 5 rows containing missing values (geom\_text).

## Warning: Removed 5 rows containing missing values (geom\_text).

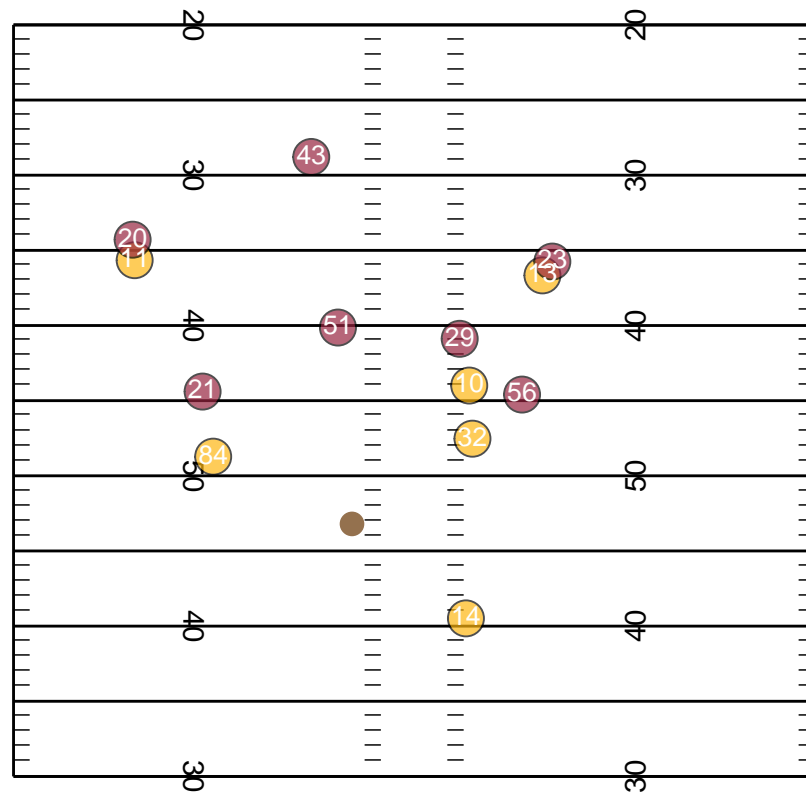
## Warning: Removed 1 rows containing missing values (geom\_text).

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



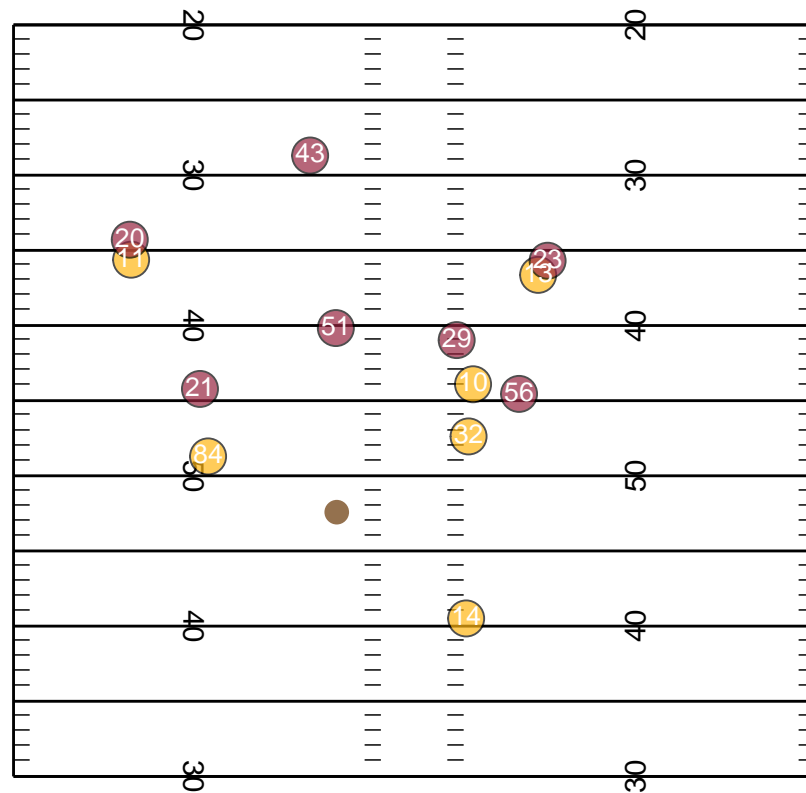
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

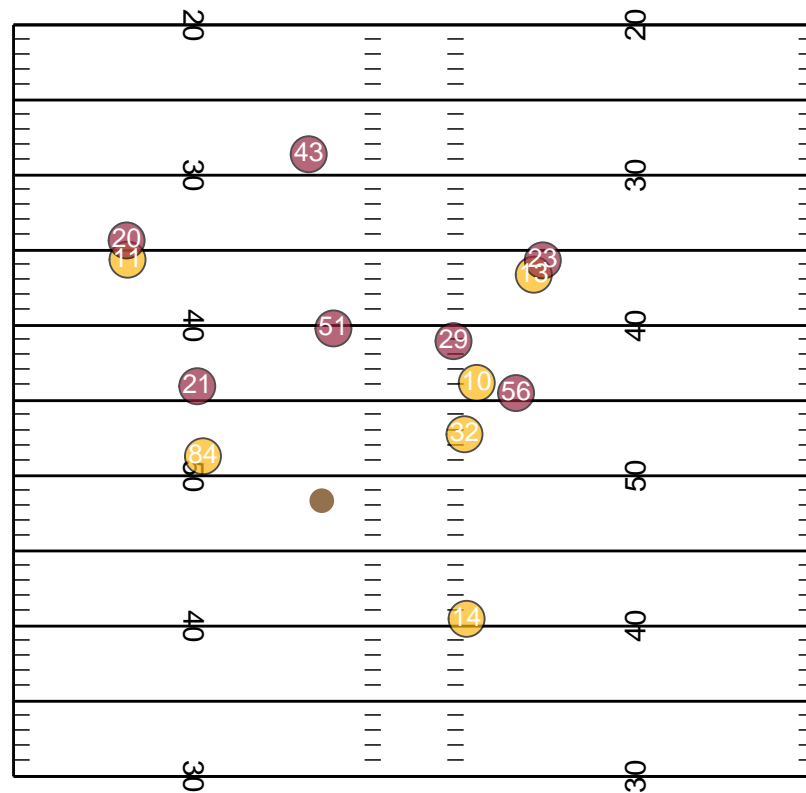
t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

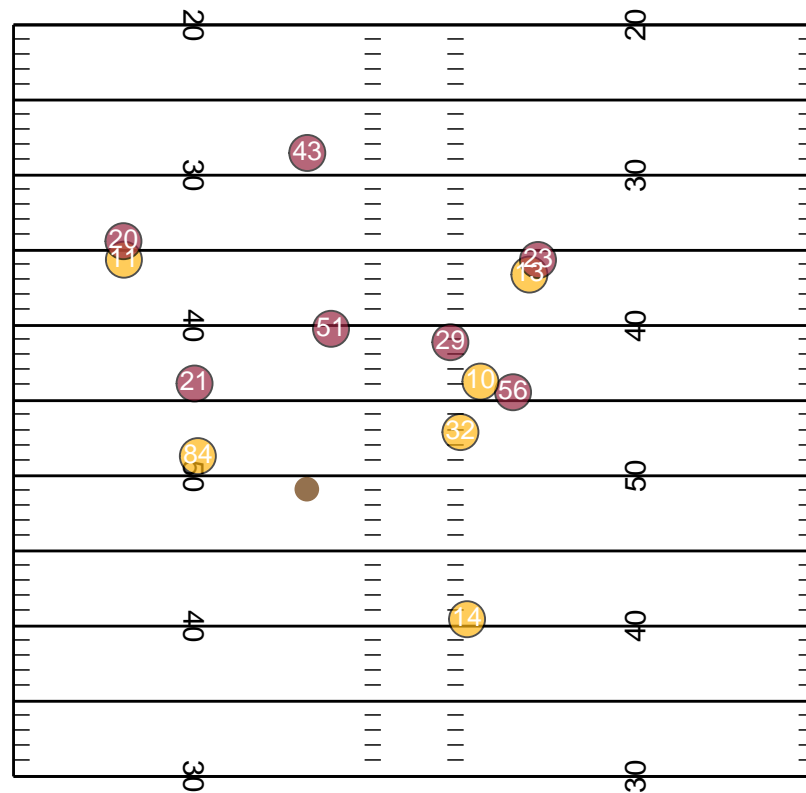


t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



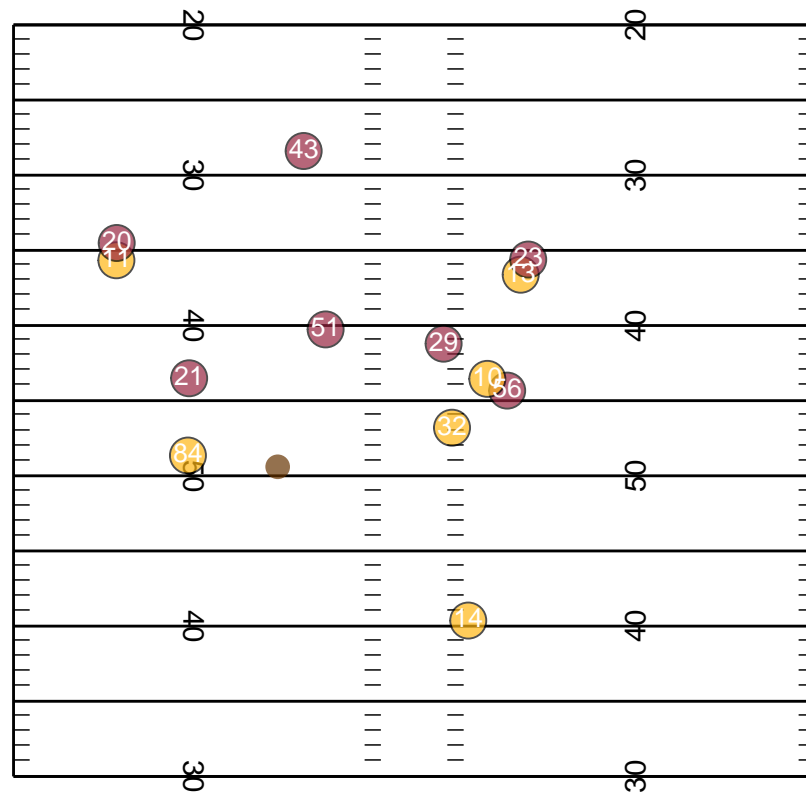
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1

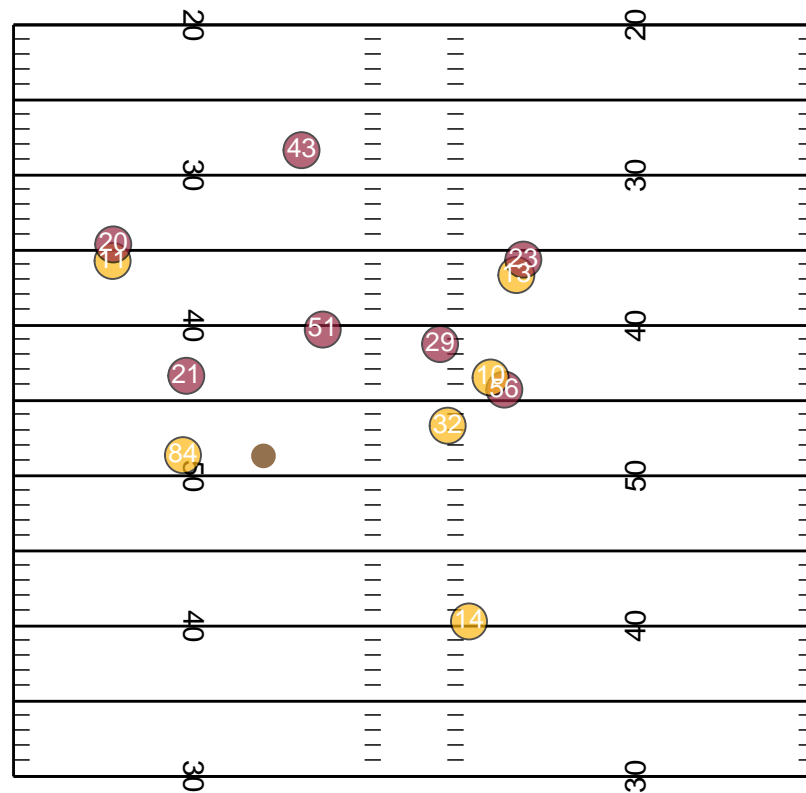


## Warning: Removed 5 rows containing missing values (geom\_text).

## Warning: Removed 5 rows containing missing values (geom\_text).

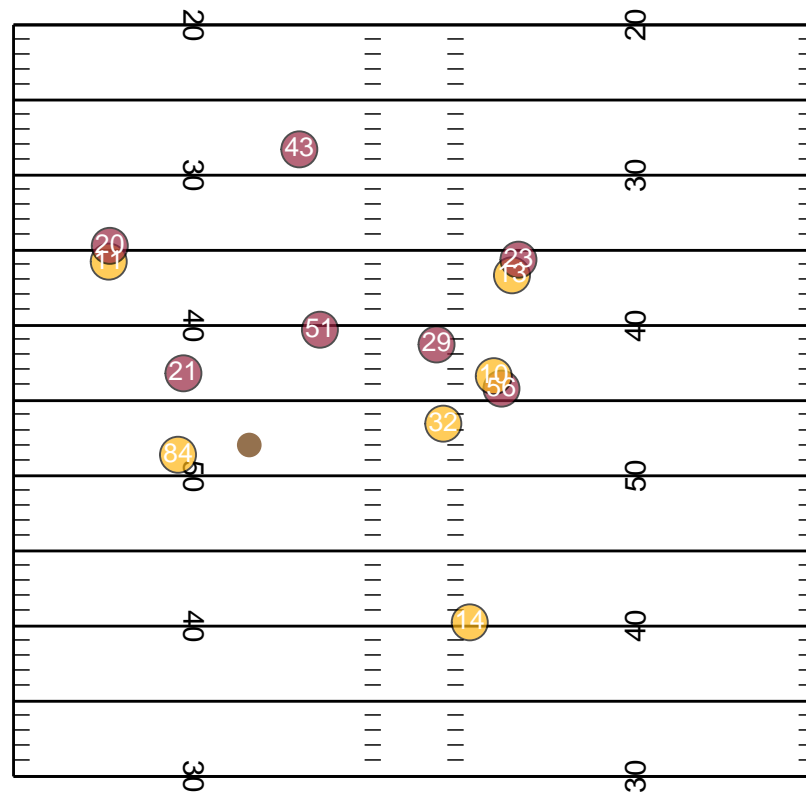
## Warning: Removed 1 rows containing missing values (geom\_text).

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



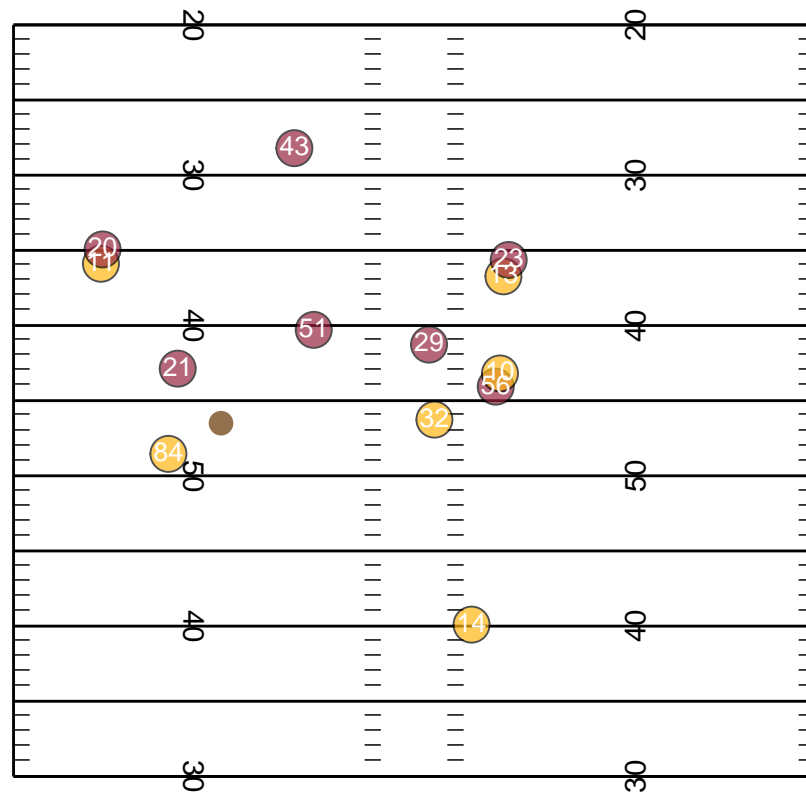
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



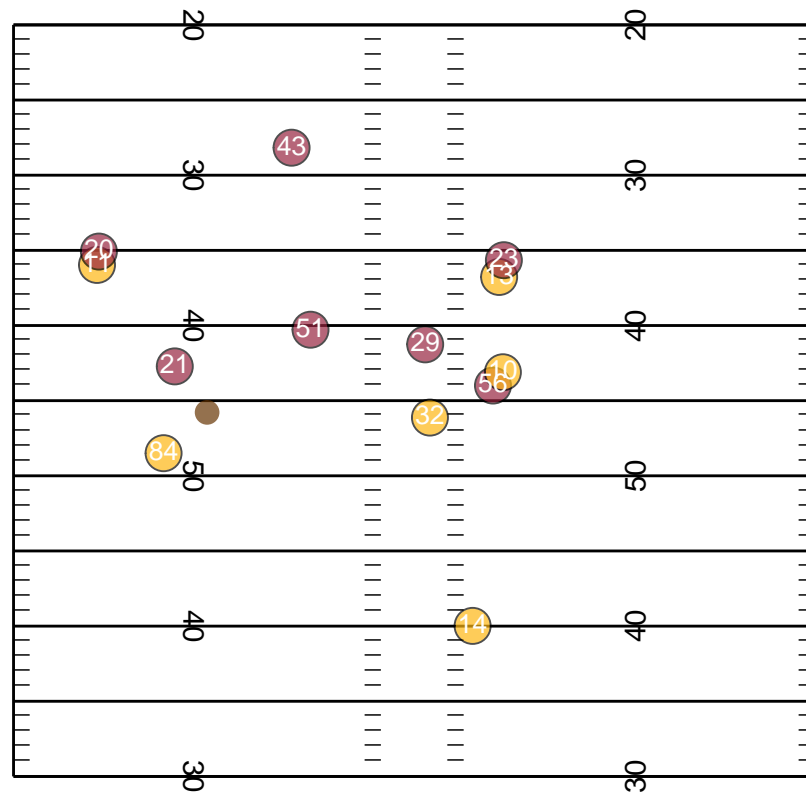
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



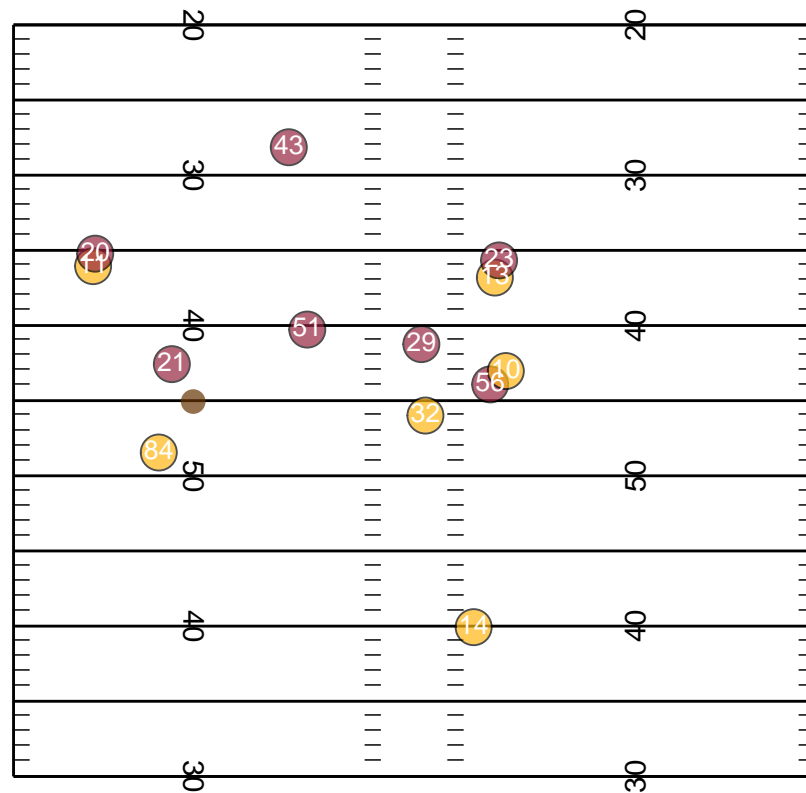
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

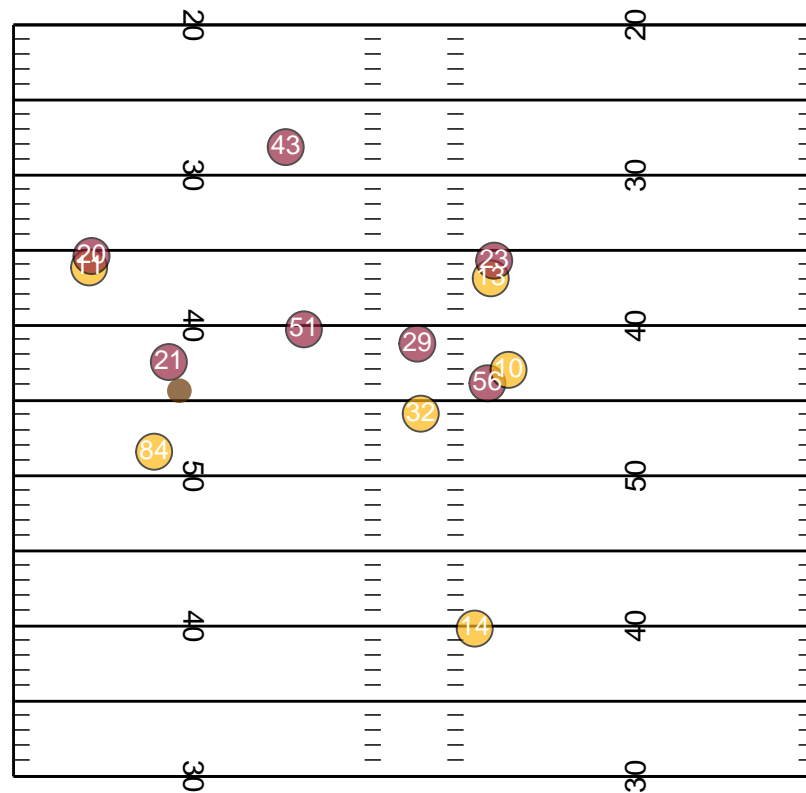
† to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

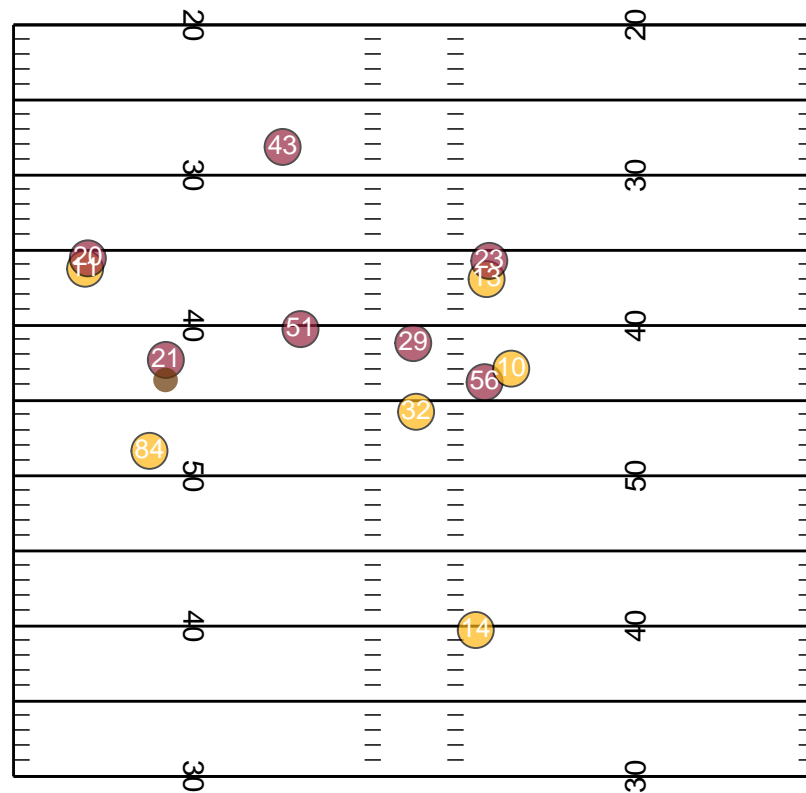


t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



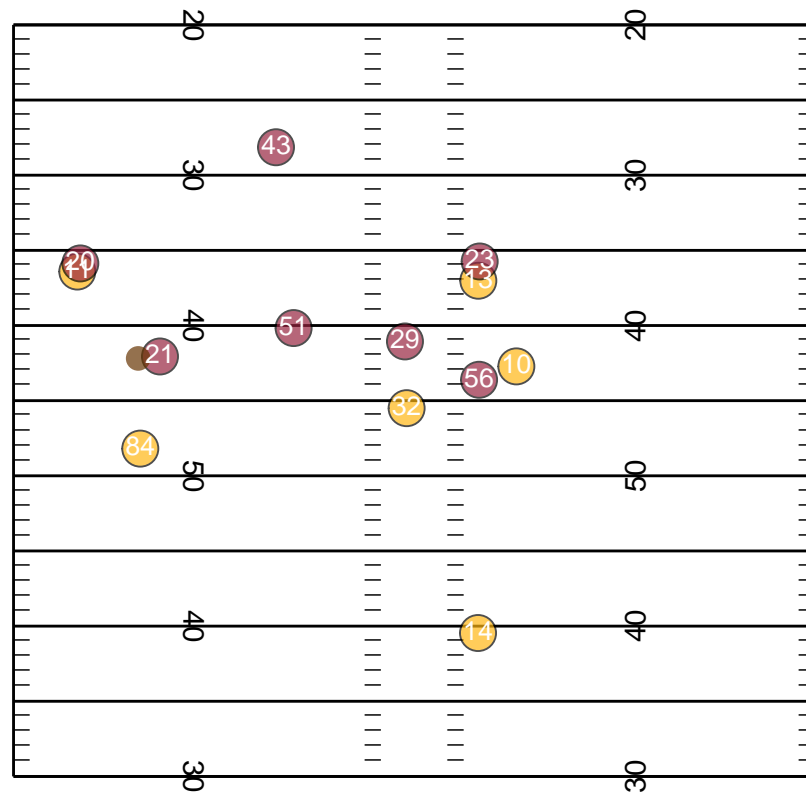
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



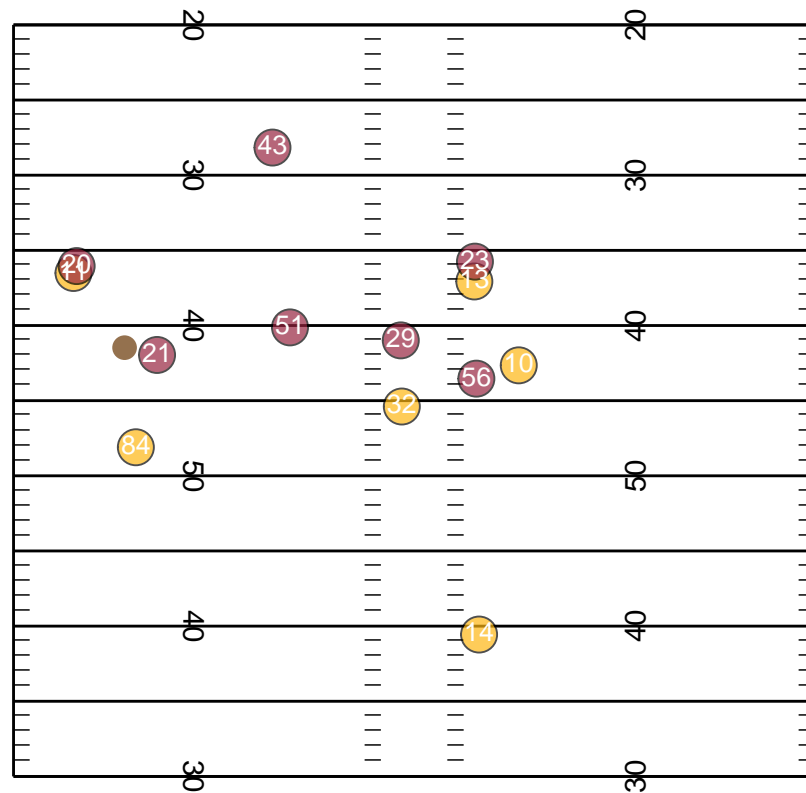
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



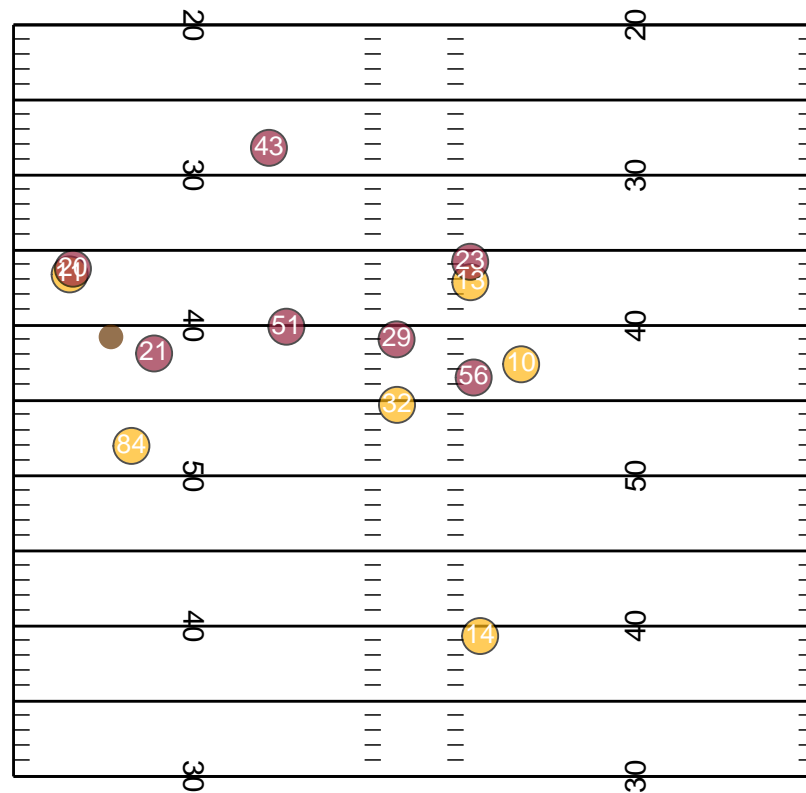
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



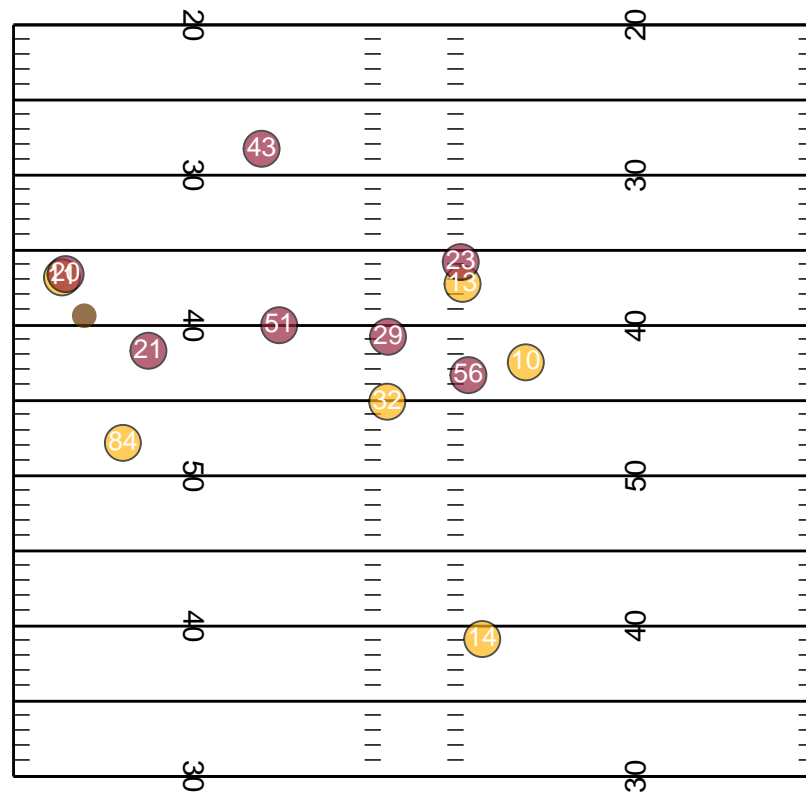
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



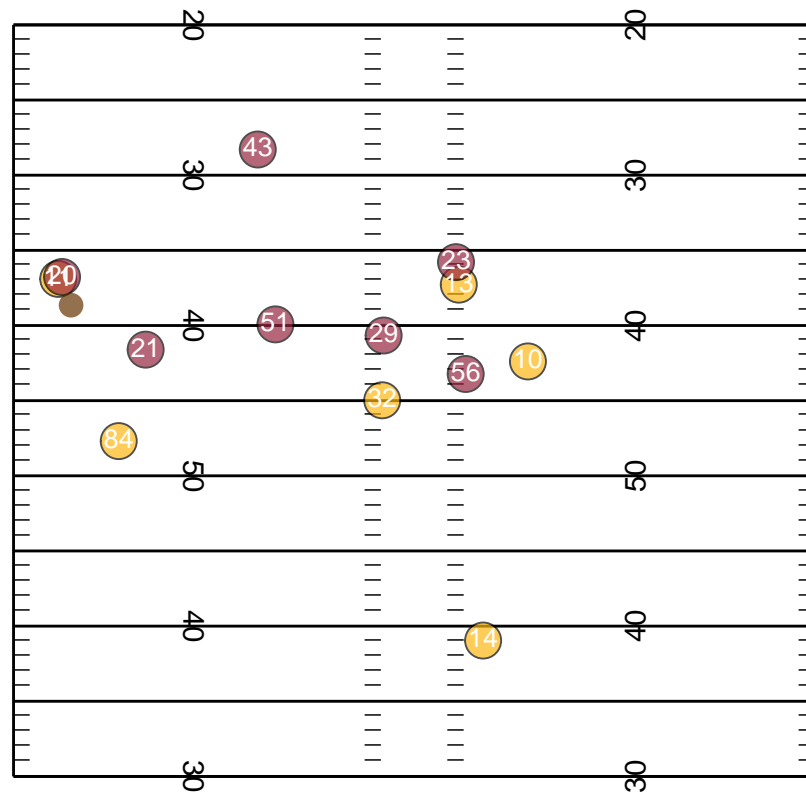
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



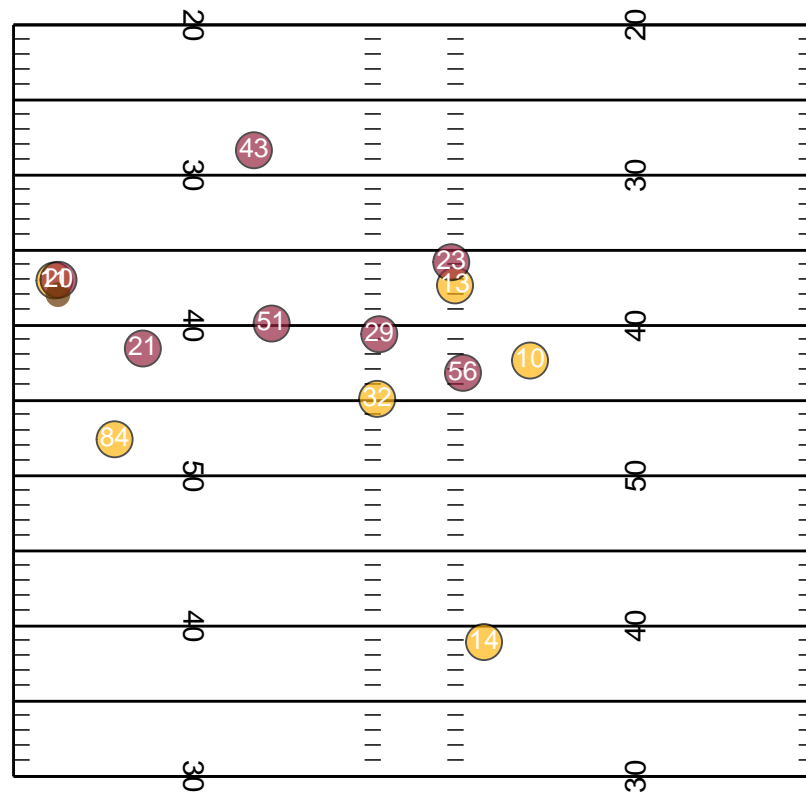
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



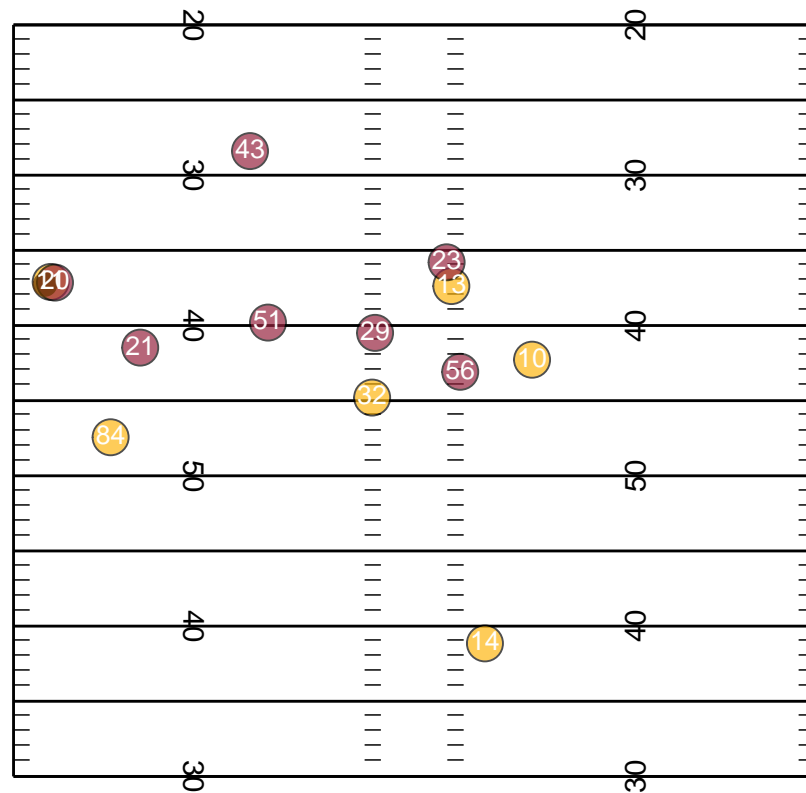
## Warning: Removed 5 rows containing missing values (geom\_text).

## Warning: Removed 5 rows containing missing values (geom\_text).

## Warning: Removed 1 rows containing missing values (geom\_text).

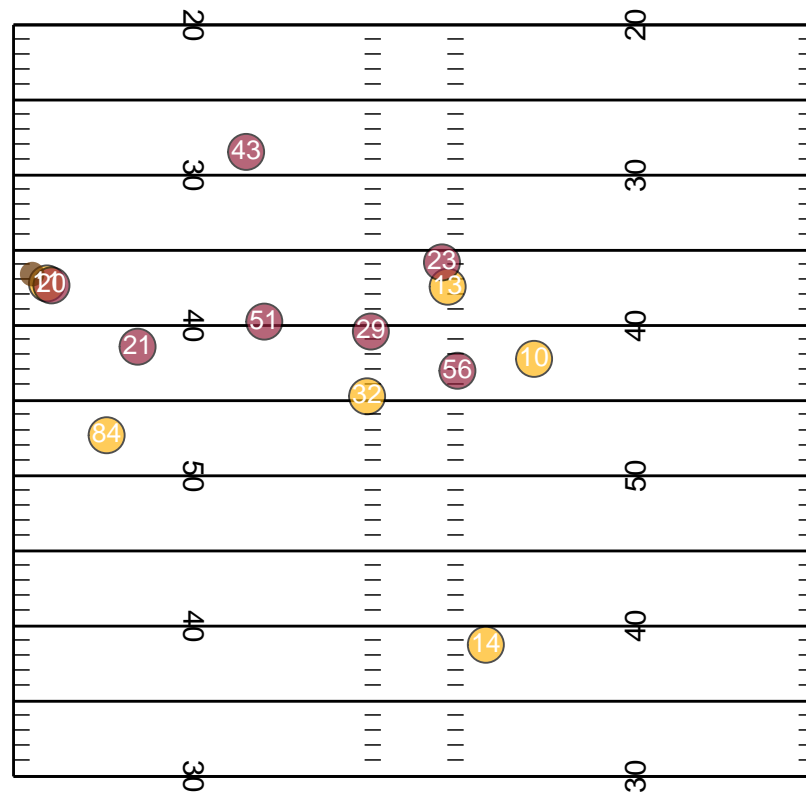


t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



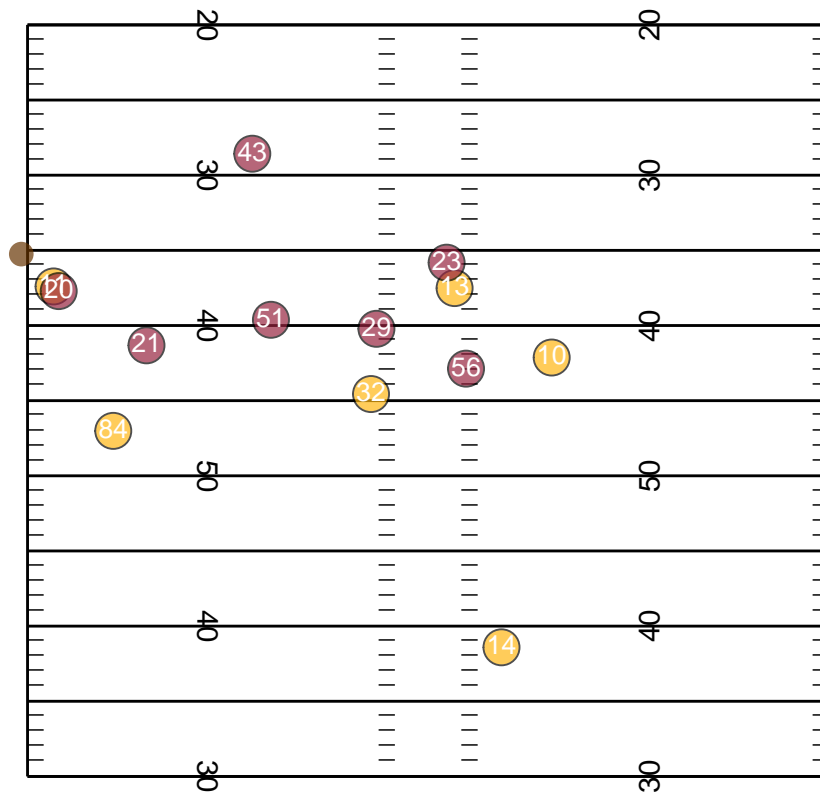
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



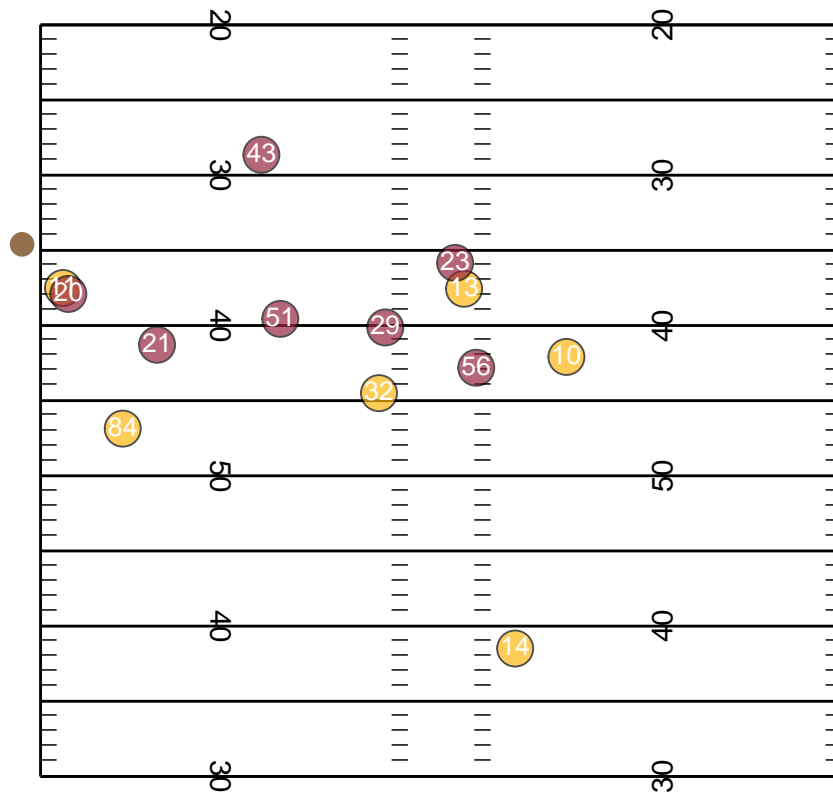
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



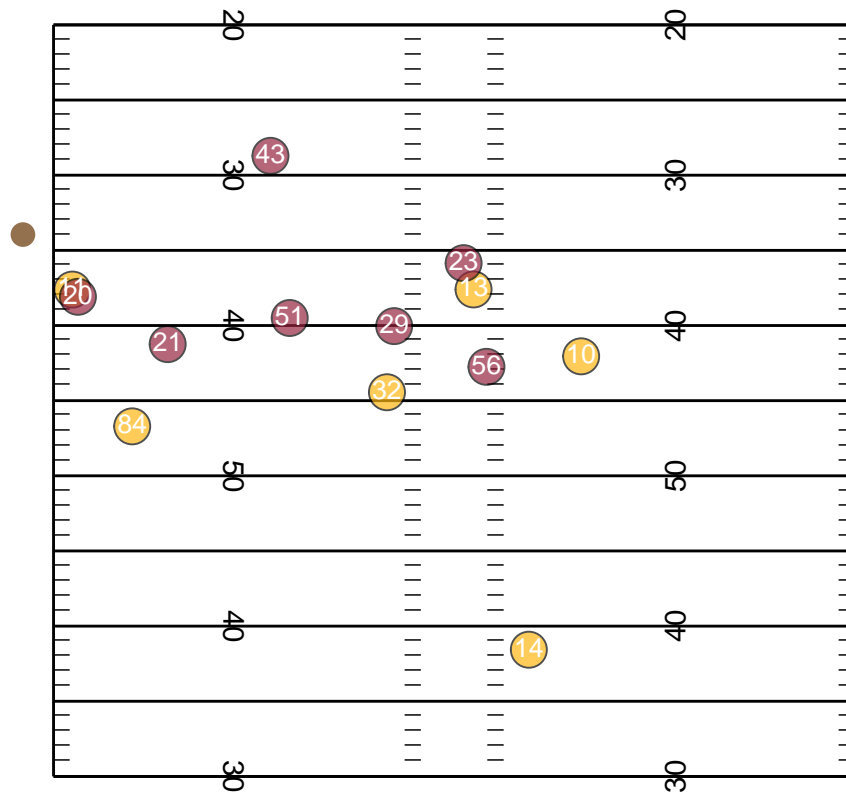
```
## Warning: Removed 5 rows containing missing values (geom_text).  
## Warning: Removed 5 rows containing missing values (geom_text).  
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



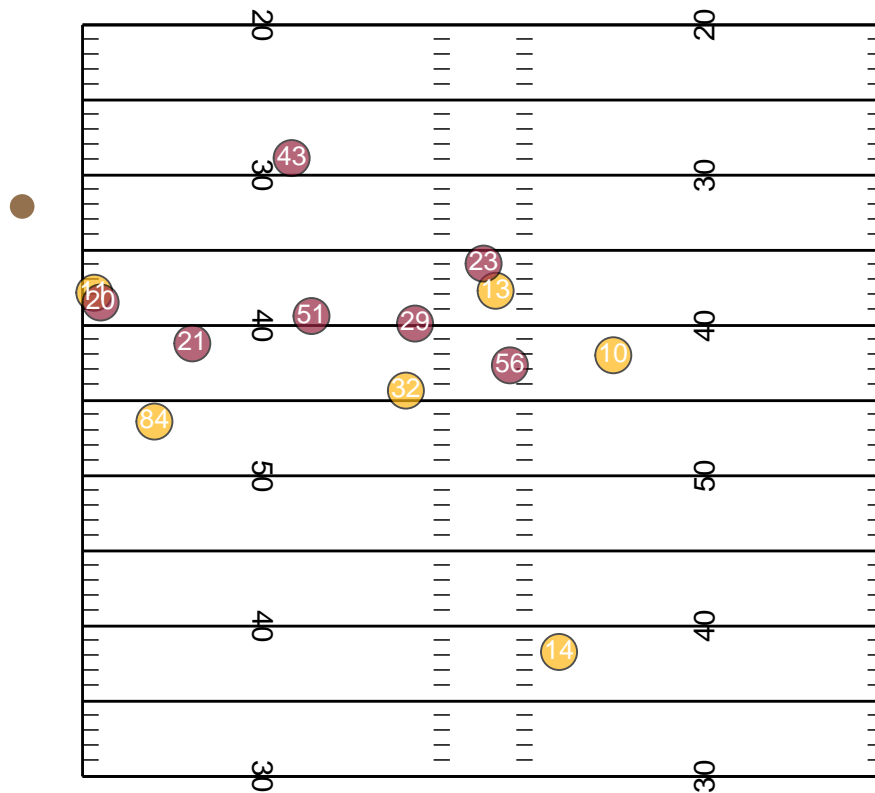
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



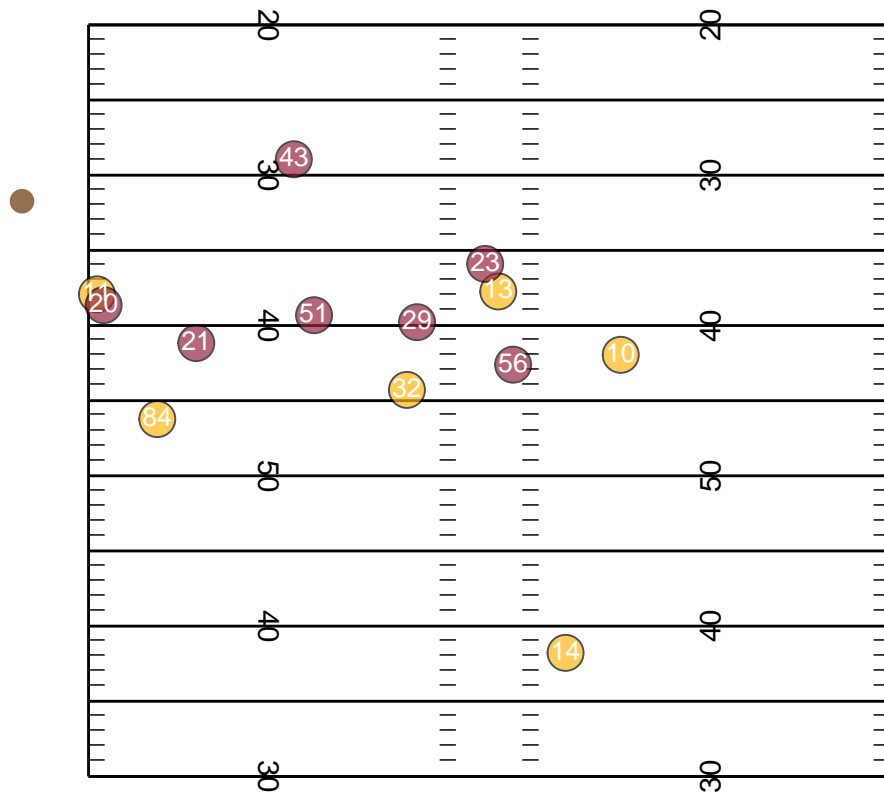
```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



```
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 5 rows containing missing values (geom_text).
## Warning: Removed 1 rows containing missing values (geom_text).
```

t to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1



† to D.Jackson. PENALTY on NO-K.Crawley, Defensive Pass Interference, 1

